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Environmental Protection Agency National Emission Standards for Hazardous Air Pollutants

PEDCo-Environmental, Inc, Cincinnati, Ohio

Prepared for

Environmental Protection Agency, Washington, D C Div of Stationary Source Enforcement

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OFFICE of ENFORCEMENT
OFFICE of GENERAL ENFORCEMENT
WASHINGTON, D.C. 20460

ENVIRONMENTAL PROTECTION AGENCY NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

EPA-340/1-77-020
June 1977

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16. ABSTRACT

This manual presents a compilation of the Environmental Protection Agency National Emission Standards for Hazardous Air Pollutants (NESHAP). Since their inception in 1971, the NESHAP have been expanded and revised several times. This manual is intended to serve as a convenient reference and source of current information to those persons who will be working with the NESHAP regulations. The manual includes the full text of the standards as they appear now (June 1, 1977) with all revisions, corrections, and additions where applicable, and the full text of all revisions and other Federal Register notices pertaining to the standards.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
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by

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Contract No. 68-01-4147
Task No. 15

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Prepared for

U.S. ENVIRONMENTAL PROTECTION AGENCY
Division of Stationary Source Enforcement
Washington, D.C. 20460

June 1977

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This report has been reviewed by the Environmental Protection Agency and approved for publication. Approval does not signify that the contents necessarily reflect the views and policies of the Agency, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.

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1. INTRODUCTION

The 1970 Amendments to the Clean Air Act are considered a landmark in the nation's efforts to control air pollution. They established the authority to control pollutants on the basis of their effects, sources, and best means of control. Section 112 of that legislation provided for establishment of National Emission Standards for Hazardous Air Pollutants, commonly referred to as NESHAPs. This manual is a compilation of those emission standards.

A hazardous air pollutant is defined as "... an air pollutant to which no ambient air quality standard is applicable and which in the judgment of the Administrator may cause, or contribute to, an increase in mortality or an increase in serious irreversible or incapacitating reversible, illness". Thus the Administrator must prescribe a NESHAP for each hazardous pollutant at a level judged to provide an ample margin of safety to protect the public health. They are emission standards rather than ambient air standards but are based solely on health effects. The determination that a pollutant is hazardous precedes public hearings and can be reversed only if hearings introduce contrary evidence. Acquisition of the necessary health effects data to support the establishment of a hazardous pollutant standard is difficult and time-consuming. However the NESHAPs are unique in that they apply to both new _and_ existing sources. All new sources are subject to control immediately upon promulgation of a standard and all existing sources are to be in compliance within 90 days of promulgation unless granted an extension. Furthermore, although costs might be considered when determining what constitutes an "ample margin of safety", such considerations are not explicitly required by Section 112.

Section 112 of the Clean Air Act defines three steps to be followed in the establishment of emission standards for hazardous pollutants. The first requirement is that the Administrator publish a list of those air pollutants for which he intends to establish emission standards. There were eleven toxic substances appraised as candidates for the first list of hazardous air pollutants: asbestos, arsenic, beryllium, cadmium, chromium, lead, mercury, nickel, polychlorinated biphenyls, polycyclic organic matter, and vanadium. Major selection criteria included (1) the severity of the associated human diseases, (2) the length of time between exposure and disease, with the longer periods considered especially dangerous, (3) the portion of the total human intake relatable to airborne substances, and (4) the linkage between sources of emissions and reported cases of diseases attributed to the pollutant. Consultations were held with federal agencies, advisory committees, and other experts. All consulted groups recommended that the initial list be limited to asbestos, beryllium, and mercury. In addition, a National Academy of Sciences study concluded that control of asbestos be undertaken as quickly as possible, and the HEW report, "Hazards of Mercury", concluded that it was urgent to use all possible means to reduce exposure to mercury immediately. Thus an initial list containing asbestos, beryllium, and mercury was published in the Federal Register on March 31, 1971.

The second step in establishing standards requires that, within 180 days after an air pollutant is included in a published list, the Administrator publish proposed regulations establishing emission standards for such pollutant together with a notice of public hearing within thirty days. Pursuant to this requirement, proposed regulations for the control of emissions of asbestos, beryllium, and mercury were published in the Federal Register on December 7, 1971.

Following the required waiting periods and public hearings, the final step, promulgation, took place on April 6, 1973. Clarifying regulations were promulgated May 3, 1974. Since then the NESHAPs have undergone several revisions, including the addition of vinyl chloride from facilities that manufacture both vinyl chloride monomer and polyvinyl chloride. Sources and pollutants covered by the NESHAPs are listed in Table 1. In addition, investigations are underway for several pollutants to determine the optimum control option for each.

All regulations promulgated under Section 112 of the Clean Air Act, represented in full as amended, follow in Section II. The reference numbers indicate that issue of the Federal Register which revised the original rules promulgated on April 6, 1973. A reference number after a main heading indicates that entire section was revised or added; a number at the end of a paragraph means only that paragraph was revised or added. Section III contains the full text of all revisions, including the preamble to each revision. Section IV is the complete text of all proposed amendments.

Table I - SUMMARY OF NESHAP

Pollutant	Date	Applicable to
Asbestos	4/6/73	Asbestos mills Roadway surfacing (asbestos tailings) Manufacturing of products containing asbestos (textiles, cement, fireproofing and insulating materials, friction products, paper, millboard, felt, floor tile, paints, coatings, caulks, adhesives, and sealants) Chlor-alkali manufacture Demolition Spraying
	10/14/75	Manufacture of shotgun shells and asphalt concrete Renovation Fabricating Insulating Waste disposal
Beryllium	4/6/73	Extraction plants Ceramic plants Foundries Incinerators Propellant plants Machining operations Rocket motor firing
Mercury	4/6/73	Ore processing Chlor-alkali manufacture
	10/14/75	Sludge dryers or incinerators
Vinyl Chloride	10/21/76	Ethylene dichloride manufacture Vinyl chloride manufacture Polyvinyl chloride manufacture

SECTION II

NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Title 40—Protection of Environment

CHAPTER 1—ENVIRONMENTAL PROTECTION AGENCY

SUBCHAPTER C—AIR PROGRAMS

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS [1]

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METHOD 106—DETERMINATION OF VINYL CHLORIDE FROM STATIONARY SOURCES [28]
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AUTHORITY: Section 112 of the Clean Air Act as added by sec. 4(a) of Pub. L. 91-604, 84 Stat. 1685 (42 U.S.C. 1857c-7); section 114 of the Clean Air Act, as added by sec. 4(a) of Pub. L. 91-604, 84 Stat. 1687, and amended by Pub. L. 93-319, sec. 6(a)(4), 88 Stat. 259 (42 U.S.C. 1857c-9); section 301(a) of the Clean Air Act, as amended by sec. 15(c)(2) of Pub. L. 91-604, 84 Stat. 1713 (42 U.S.C. 1857g(a)). [28]

Subpart A—General Provisions

§ 61.01 Applicability.

The provisions of this part apply to the owner or operator of any stationary source for which a standard is prescribed under this part.

§ 61.02 Definitions.

As used in this part, all terms not defined herein shall have the meaning given them in the act:

(a) "Act" means the Clean Air Act (42 U.S.C. 1857 et seq.).

(b) "Administrator" means the Administrator of the Environmental Protection Agency or his authorized representative.

(c) "Alternative method" means any method of sampling and analyzing for an air pollutant which is not a reference method or an equivalent method but which has been demonstrated to the Administrator's satisfaction to produce, in specific cases, results adequate for his determination of compliance. [2]

(d) "Commenced" means that an owner or operator has undertaken a continuous program of construction or modification or that an owner or operator has entered into a contractual obligation to undertake and complete, within a reasonable time, a continuous program of construction or modification.

(e) "Compliance schedule" means the date or dates by which a source or category of sources is required to comply with the standards of this part and with any steps toward such compliance which are set forth in a waiver of compliance under § 61.11.

(f) "Construction" means fabrication, erection, or installation of a stationary source.

(g) "Effective date" is the date of promulgation in the FEDERAL REGISTER of an applicable standard or other regulation under this part.

(h) "Equivalent method" means any method of sampling and analyzing for an air pollutant which has been demonstrated to the Administrator's satisfaction to have a consistent and quantitatively known relationship to the reference method under specified conditions.

(i) "Existing source" means any stationary source which is not a new source.

(j) "Modification" means any physical change in, or change in the method of operation of, a stationary source which increases the amount of any hazardous air pollutant emitted by such source or which results in the emission of any hazardous air pollutant not previously emitted, except that:

(1) Routine maintenance, repair, and replacement shall not be considered physical changes, and

(2) The following shall not be considered a change in the method of operation:

(i) An increase in the production rate, if such increase does not exceed the operating design capacity of the stationary source;

(ii) An increase in hours of operation.

(k) "New source" means any stationary source, the construction or modification of which is commenced after the publication in the FEDERAL REGISTER of proposed national emission standards for hazardous air pollutants which will be applicable to such source.

(l) "Owner or operator" means any person who owns, leases, operates, controls, or supervises a stationary source.

(m) "Reference method" means any method of sampling and analyzing for an air pollutant, as described in appendix B to this part.

(n) "Startup" means the setting in operation of a stationary source for any purpose.

(o) "Standard" means a national emission standard for a hazardous air pollutant proposed or promulgated under this part.

(p) "Stationary source" means any building, structure, facility, or installation which emits or may emit any air pollutant which has been designated as hazardous by the Administrator.

§ 61.03 Abbreviations.

The abbreviations used in this part have the following meanings:

°C—Degrees Centigrade.
cfm—Cubic feet per minute.
ft^2—Square feet.
ft^3—Cubic feet.
°F—Degrees Fahrenheit.
in—Inch.
l—Liter.
ml—Milliliter.
M—Molar.
m^3—Cubic meter.
nm—Nanometer.
oz—Ounces.
v/v—Volume per volume.
yd^2—Square yards.
w.g.—Water gage.
inHg—Inches of mercury.
inH_2O—Inches of water.
g—Grams.
mg—Milligrams.
N—Normal.
°R—Degree Rankine.
min—Minute
sec—Second.
avg.—Average.
I.D.—Inside diameter.
O.D.—Outside diameter.
μg—Micrograms (10^{-6} gram).
%—Percent.
Hg—Mercury.
Be—Beryllium.

§ 61.04 Address. [4]

(a) All requests, reports, applications, submittals, and other communications to the Administrator pursuant to this part shall be submitted in duplicate and addressed to the appropriate Regional Office of the Environmental Protection Agency, to the attention of the Director, Enforcement Division. The regional offices are as follows:

Region I (Connecticut, Maine, New Hampshire, Massachusetts, Rhode Island, Vermont), John F. Kennedy Federal Building, Boston, Massachusetts 02203.

Region II (New York, New Jersey, Puerto Rico, Virgin Islands), Federal Office Building, 26 Federal Plaza (Foley Square), New York, N.Y. 10007.

Region III (Delaware, District of Columbia, Pennsylvania, Maryland, Virginia, West Virginia), Curtis Building, Sixth and Walnut Streets, Philadelphia, Pennsylvania 19106.

Region IV (Alabama, Florida, Georgia, Mississippi, Kentucky, North Carolina, South Carolina, Tennessee), Suite 300, 1421 Peachtree Street, Atlanta, Georgia 30309.

Region V (Illinois, Indiana, Minnesota, Michigan, Ohio, Wisconsin), 230 South Dearborn, Chicago, Illinois 60604 [3,37]

Region VI (Arkansas, Louisiana, New Mexico, Oklahoma, Texas), 1600 Patterson Street, Dallas, Texas 75201.

Region VII (Iowa, Kansas, Missouri, Nebraska), 1735 Baltimore Street, Kansas City, Missouri 64108.

Region VIII (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming), 196 Lincoln Towers, 1860 Lincoln Street, Denver, Colorado 80203.

Region IX (Arizona, California, Hawaii, Nevada, Guam, American Samoa), 100 California Street, San Francisco, California 94111.

Region X (Washington, Oregon, Idaho, Alaska), 1200 Sixth Avenue, Seattle, Washington 98101.

(b) Section 112(d) directs the Administrator to delegate to each State, when appropriate, the authority to implement and enforce the national emission standards for hazardous air pollutants for stationary sources located in such State. All information required to be submitted to EPA under paragraph (a) of this section, must also be submitted to the appropriate State Agency of any State to which this authority has been delegated (provided, that each specific delegation may exempt sources from a certain federal or State reporting requirement). The appropriate mailing address for those States whose delegation request has been approved is as follows:

(A) [reserved].

(B) State of Alabama, Air Pollution Control Division, Air Pollution Control Commission, 645 S. McDonough Street, Montgomery, Alabama 36104. [25]

(C) [reserved].

(D) Arizona

Pima County Air Pollution Control District, 151 West Congress Street, Tucson AZ 85701. [30]

(E) [reserved]

(F) California [5,6,18,20,21,24,29,31]

Bay Area Air Pollution Control District, 939 Ellis Street, San Francisco, CA 94109.

Del Norte County Air Pollution Control District, Courthouse, Crescent City, CA 95531.

Fresno County Air Pollution Control District, 515 S. Cedar Avenue, Fresno, CA 93702.

Humboldt County Air Pollution Control District, 5600 S. Broadway, Eureka, CA 95501.

Kern County Air Pollution Control District, 1700 Flower Street (P.O. Box 997) Bakersfield, CA 93302.

Madera County Air Pollution Control District, 135 W. Yosemite Avenue, Madera, CA 93637.

Mendocino County Air Pollution Control District, County Courthouse, Ukiah, CA 95482.

Monterey Bay Unified Air Pollution Control District, 420 Church Street (P.O: Box 487), Salinas, CA 93901.

Northern Sonoma County Air Pollution Control District, 3313 Chanate Road, Santa Rosa, CA 95404.

Sacramento County Air Pollution Control District, 3701 Branch Center Road, Sacramento, CA 95827.

San Diego County Air Pollution Control District, 9150 Chesapeake Drive, San Diego, CA 92123.

San Joaquin County Air Pollution Control District, 1601 E. Hazelton Street (P.O. Box 2009), Stockton, CA 95201.

Santa Barbara Air Pollution Control District, 4440 Calle Real, Santa Barbara, CA 93110.

Stanislaus County Air Pollution Control District, 820 Scenic Drive, Modesto, CA 95350.

Trinity County Air Pollution Control District, Box AJ, Weaverville, CA 96093.

Ventura County Air Pollution Control District, 625 E. Santa Clara Street, Ventura, CA 93001.

(G)—State of Colorado, Colorado Air Pollution Control Division, 4210 East 11th Avenue, Denver, Colorado 80220. 9

(H) State of Connecticut, Department of Environmental Protection, State Office Building, Hartford, Connecticut 06115. 16

(I)-(K) [reserved].

(L) State of Georgia, Environmental Protection Division, Department of Natural Resources, 270 Washington Street, S.W., Atlanta, Georgia 30334. 19

(M)-(O) [reserved].

(P) State of Indiana, Indiana Air Pollution Control Board, 1330 West Michigan Street, Indianapolis, Indiana 46206. 26

(Q)-(T) [reserved].

(U) State of Maine, Department of Environmental Protection, State House, Augusta, Maine 04330. 11

(V) [reserved].

(W) Massachusetts Department of Environmental Quality Engineering, Division of Air Quality Control, 600 Washington Street, Boston, Massachusetts 02111. 17

(X)—State of Michigan, Air Pollution Control Division, Michigan Department of Natural Resources, Stevens T. Mason Building, 8th Floor, Lansing, Michigan 48926 12

(Y)-(Z) [reserved].
(AA)-(DD) [reserved].

(EE) New Hampshire Air Pollution Control Agency, Department of Health and Welfare, State Laboratory Building, Hazen Drive, Concord, New Hampshire 03301. 17

(FF)-(GG) [reserved].

(HH)—New York: New York State Department of Environmental Conservation, 50 Wolf Road, New York 12233, attention: Division of Air Resources. 6

(II) North Carolina Environmental Management Commission, Department of Natural and Economic Resources, Division of Environmental Management, P.O. Box 27687, Raleigh, North Carolina 27611. Attention: Air Quality Section. 37

(JJ)—State of North Dakota, State Department of Health, State Capitol, Bismarck, North Dakota 58501. 27

(KK)-(LL) [reserved].

(MM)—State of Oregon, Department of Environmental Quality, 1234 SW Morrison Street, Portland, Oregon 97205. 14

(NN)(a) Commonwealth of Pennsylvania (except for City of Philadelphia and Allegheny County)

Pennsylvania Department of Environmental Resources,
Bureau of Air Quality and Noise Control,
Post Office Box 2063,
Harrisburg, Pennsylvania 17120. 35

(NN)(b) City of Philadelphia.
Philadelphia Department of Public Health,
Air Management Services,
801 Arch Street,
Philadelphia, Pennsylvania 19107. 35

(OO) [reserved].

(PP) State of South Carolina, Office of Environmental Quality Control, Department of Health and Environmental Control, 2600 Bull Street, Columbia, South Carolina 29201. 34

(QQ)-(TT) [reserved].

(UU)—State of Vermont, Agency of Environmental Protection, Box 489, Montpelier, Vermont 05602. 33

(VV) Commonwealth of Virginia, Virginia State Air Pollution Control Board, Room 1106, Ninth Street Office Building, Richmond, Virginia 23219. 18

(WW)(i) Washington; State of Washington, Department of Ecology, Olympia, Washington 98504.

(ii) Northwest Air Pollution Authority, 207 Pioneer Building, Second and Pine Streets, Mount Vernon, Washington 98273.

(iii) Puget Sound Air Pollution Control Agency, 410 West Harrison Street, Seattle, Washington 98119.

(iv) Spokane County Air Pollution Control Authority, North 811 Jefferson, Spokane, Washington 99201.

(v) Yakima County Clean Air Authority, County Courthouse, Yakima, Washington 98901. 4, 18

(vi) Olympic Air Pollution Control Authority, 120 East State Avenue, Olympia, Washington 98501.

(vii) Southwest Air Pollution Control Authority, Suite 7601 H, NE Hazel Dell Avenue, Vancouver, Washington 98665. 13

(XX) [reserved].

(YY) Wisconsin—
Wisconsin Department of Natural Resources,
P.O. Box 7921, Madison, Wisconsin 53707. 37

(ZZ) [reserved].

(AAA)-(BBB) [reserved].

(CCC)—U.S. Virgin Islands: U.S. Virgin Islands Department of Conservation and Cultural Affairs, P.O. Box 578, Charlotte Amalie, St. Thomas, U.S. Virgin Islands 00801. 22

(DDD) [reserved].

§ 61.05 Prohibited activities.

(a) After the effective date of any standard prescribed under this part, no owner or operator shall construct or modify any stationary source subject to such standard without first obtaining written approval of the Administrator in accordance with this subpart, except under an exemption granted by the President under section 112(c)(2) of the act. Sources, the construction or modification of which commenced after the publication date of the standards proposed to be applicable to such source, are subject to this prohibition.

(b) After the effective date of any standard prescribed under this part, no owner or operator shall operate any new source in violation of such standard except under an exemption granted by the President under section 112(c)(2) of the act.

(c) Ninety days after the effective date of any standard prescribed under this part, no owner or operator shall operate any existing stationary source in violation of such standard, except under a waiver granted by the Administrator in accordance with this subpart or under an exemption granted by the President under section 112(c)(2) of the act.

(d) No owner or operator subject to the provisions of this part shall fail to report, revise reports, or report source test results as required under this part.

§ 61.06 Determination of construction or modification.

Upon written application by an owner or operator, the Administrator will make a determination of whether actions taken or intended to be taken by such owner or operator constitute construction or modification or the commencement thereof within the meaning of this part. The Administrator will within 30 days of receipt of sufficient information to evaluate an application, notify the owner or operator of his determination.

§ 61.07 Application for approval of construction or modification.

(a) The owner or operator of any new source to which a standard prescribed under this part is applicable shall, prior to the date on which construction or modification is planned to commence, or within 30 days after the effective date in the case of a new source that already has commenced construction or modification and has not begun operation, submit to the Administrator an application for approval of such construction or modification. A separate application shall be submitted for each stationary source.

(b) Each application shall include:

(1) The name and address of the applicant.

(2) The location or proposed location of the source.

(3) Technical information describing the proposed nature, size, design, operating design capacity, and method of operation of the source, including a description of any equipment to be used for control of emissions. Such technical in-

formation shall include calculations of emission estimates in sufficient detail to permit assessment of the validity of such calculations.

§ 61.08 Approval by Administrator.

(a) The Administrator will, within 60 days of receipt of sufficient information to evaluate an application under § 61.07, notify the owner or operator of approval or intention to deny approval of construction or modification.

(b) If the Administrator determines that a stationary source for which an application pursuant to § 61.07 was submitted will, if properly operated, not cause emissions in violation of a standard, he will approve the construction or modification of such source.

(c) Prior to denying any application for approval of construction or modification pursuant to this section, the Administrator will notify the owner or operator making such application of the Administrator's intention to issue such denial, together with:

(1) Notice of the information and findings on which such intended denial is based, and

(2) Notice of opportunity for such owner or operator to present, within such time limit as the Administrator shall specify, additional information or arguments to the Administrator prior to final action on such application.

(d) A final determination to deny any application for approval will be in writing and will set forth the specific grounds on which such denial is based. Such final determination will be made within 60 days of presentation of additional information or arguments, or 60 days after the final date specified for presentation, if no presentation is made.

(e) Neither the submission of an application for approval nor the Administrator's granting of approval to construct or modify shall:

(1) Relieve an owner or operator of legal responsibility for compliance with any applicable provision of this part or of any other applicable Federal, State, or local requirement, or

(2) Prevent the Administrator from implementing or enforcing this part or taking any other action under the act.

§ 61.09 Notification of startup.

(a) Any owner or operator of a source which has an initial startup after the effective date of a standard prescribed under this part shall furnish the Administrator written notification as follows:

(1) A notification of the anticipated date of initial startup of the source not more than 60 days nor less than 30 days prior to such date.

(2) A notification of the actual date of initial startup of the source within 15 days after such date.

§ 61.10 Source reporting and waiver request.

(a) The owner or operator of any existing source, or any new source to which a standard prescribed under this part is applicable which had an initial startup which preceded the effective date of a standard prescribed under this part shall, within 90 days after the effective date, provide the following information in writing to the Administrator:

(1) Name and address of the owner or operator.

(2) The location of the source.

(3) The type of hazardous pollutants emitted by the stationary source.

(4) A brief description of the nature, size, design, and method of operation of the stationary source including the operating design capacity of such source. Identify each point of emission for each hazardous pollutant.

(5) The average weight per month of the hazardous materials being processed by the source, over the last 12 months preceding the date of the report.

(6) A description of the existing control equipment for each emission point.

(i) Primary control device(s) for each hazardous pollutant.

(ii) Secondary control device(s) for each hazardous pollutant.

(iii) Estimated control efficiency (percent) for each control device.

(7) A statement by the owner or operator of the source as to whether he can comply with the standards prescribed in this part within 90 days of the effective date.

(b) The owner or operator of an existing source unable to operate in compliance with any standard prescribed under this part may request a waiver of compliance with such standard for a period not exceeding 2 years from the effective date. Any request shall be in writing and shall include the following information:

(1) A description of the controls to be installed to comply with the standard.

(2) A compliance schedule, including the date each step toward compliance will be reached. Such list shall include as a minimum the following dates:

(i) Date by which contracts for emission control systems or process modifications will be awarded, or date by which orders will be issued for the purchase of component parts to accomplish emission control or process modification;

(ii) Date of initiation of onsite construction or installation of emission control equipment or process change;

(iii) Date by which onsite construction or installation of emission control equipment or process modification is to be completed; and

(iv) Date by which final compliance is to be achieved.

(3) A description of interim emission control steps which will be taken during the waiver period.

(c) Changes in the information provided under paragraph (a) of this section shall be provided to the Administrator within 30 days after such change, except that if changes will result from modification of the source, as defined in § 61.02 (j), the provisions of § 61.07 and § 61.08 are applicable.

(d) The format for reporting under this section is included as appendix A of this part. Advice on reporting the status of compliance may be obtained from the Administrator.

§ 61.11 Waiver of compliance.

(a) Based on the information provided in any request under § 61.10, or other information, the Administrator may grant a waiver of compliance with a standard for a period not exceeding 2 years from the effective date of such standard.

(b) Such waiver will be in writing and will:

(1) Identify the stationary source covered.

(2) Specify the termination date of the waiver. The waiver may be terminated at an earlier date if the conditions specified under paragraph (b)(3) of this section are not met.

(3) Specify dates by which steps toward compliance are to be taken; and impose such additional conditions as the Administrator determines to be necessary to assure installation of the necessary controls within the waiver period, and to assure protection of the health of persons during the waiver period.

(c) Prior to denying any request for a waiver pursuant to this section, the Administrator will notify the owner or operator making such request of the Administrator's intention to issue such denial, together with:

(1) Notice of the information and findings on which such intended denial is based, and

(2) Notice of opportunity for such owner or operator to present, within such time limit as the Administrator specifies, additional information or arguments to the Administrator prior to final action on such request.

(d) A final determination to deny any request for a waiver will be in writing and will set forth the specific grounds on which such denial is based. Such final determination will be made within 60 days after presentation of additional information or arguments, or 60 days after the final date specified for such presentation, if no presentation is made.

(e) The granting of a waiver under this section shall not abrogate the Administrator's authority under section 114 of the act.

§ 61.12 Emission tests and monitoring.

(a) Emission tests and monitoring shall be conducted and reported as set forth in this part and appendix B to this part.

(b) The owner or operator of a new source subject to this part, and at the request of the Administrator, the owner or operator of an existing source subject to this part, shall provide or cause to be provided, emission testing facilities as follows:

(1) Sampling ports adequate for test methods applicable to such source.

(2) Safe sampling platform(s).

(3) Safe access to sampling platform(s).

(4) Utilities for sampling and testing equipment.

§ 61.13 Waiver of emission tests.

(a) Emission tests may be waived upon written application to the Administrator if, in his judgment, the source is meeting the standard, or if the source is operating under a waiver of compliance or has requested a waiver of compliance.

(b) If application for waiver of the emission test is made, such application shall accompany the information required by § 61.10. The appropriate form is contained in appendix A to this part.

(c) Approval of any waiver granted pursuant to this section shall not abrogate the Administrator's authority under the act or in any way prohibit the Administrator from later canceling such waiver. Such cancellation will be made only after notice is given to the owner or operator of the source.

§ 61.14 Source test and analytical methods.

(a) Methods 101, 102, and 104 in appendix B to this part shall be used for all source tests required under this part, unless an equivalent method or an alternative method has been approved by the Administrator.

(b) Method 103 in appendix B to this part is hereby approved by the Administrator as an alternative method for sources subject to § 61.32(a) and § 61.42(b).

(c) The Administrator may, after notice to the owner or operator, withdraw approval of an alternative method granted under paragraphs (a), (b) or (d) of this section. Where the test results using an alternative method do not adequately indicate whether a source is in compliance with a standard, the Administrator may require the use of the reference method or its equivalent.[7]

(d) Method 105 in Appendix B to this part is hereby approved by the Administrator as an alternative method for sources subject to § 61.52(b).[7]

§ 61.15 Availability of information.[23]

The availability to the public of information provided to, or otherwise obtained by, the Administrator under this part shall be governed by Part 2 of this chapter.

§ 61.16 State authority.

(a) The provisions of this part shall not be construed in any manner to preclude any State or political subdivision thereof from:

(1) Adopting and enforcing any emission limiting regulation applicable to a stationary source, provided that such emission limiting regulation is not less stringent than the standards prescribed under this part.

(2) Requiring the owner or operator of a stationary source, other than a stationary source owned or operated by the United States, to obtain permits, licenses, or approvals prior to initiating construction, modification, or operation of such source.

§ 61.17 Circumvention.[7]

No owner or operator subject to the provisions of this part shall build, erect, install, or use any article, machine, equipment, process, or method, the use of which conceals an emission which would otherwise constitute a violation of an applicable standard. Such concealment includes, but is not limited to, the use of gaseous dilutants to achieve compliance with a visible emissions standard, and the piecemeal carrying out of an operation to avoid coverage by a standard that applies only to operations larger than a specified size.

Subpart B—National Emission Standard for Asbestos

§ 61.20 Applicability.

The provisions of this subpart are applicable to those sources specified in § 61.22.

§ 61.21 Definitions.

Terms used in this subpart are defined in the act, in subpart A of this part, or in this section as follows:

(a) "Asbestos" means actinolité, amosite, anthophyllite, chrysotile, crocidolite, tremolite.

(b) "Asbestos material" means asbestos or any material containing asbestos.

(c) "Particulate asbestos material" means finely divided particles of asbestos material.

(d) "Asbestos tailings" means any solid waste product of asbestos mining or milling operations which contains asbestos.

(e) "Outside air" means the air outside buildings and structures.

(f) "Visible emissions" means any emissions which are visually detectable without the aid of instruments and which contain particulate asbestos material.

(g) "Asbestos mill" means any facility engaged in the conversion or any intermediate step in the conversion of asbestos ore into commercial asbestos. Outside storage of asbestos materials is not considered a part of such facility. [2]

(h) "Commercial asbestos" means any variety of asbestos which is produced by extracting asbestos from asbestos ore. [2]

(i) "Manufacturing" means the combining of commercial asbestos, or in the case of woven friction products the combining of textiles containing commercial asbestos, with any other material(s), including commercial asbestos, and the processing of this combination into a product as specified in § 61.22(c). [2]

(j) "Demolition" means the wrecking or taking out of any load-supporting structural member and any related removing or stripping of friable asbestos materials. [2,7]

(k) "Friable asbestos material" means any material that contains more than 1 percent asbestos by weight and that can be crumbled, pulverized, or reduced to powder, when dry, by hand pressure. [7]

(l) "Control device asbestos waste" means any asbestos-containing waste material that is collected in a pollution control device. [7]

(m) "Renovation" means the removing or stripping of friable asbestos material used to insulate or fireproof any pipe, duct, boiler, tank, reactor, turbine, furnace, or structural member. Operations in which load-supporting structural members are wrecked or taken out are excluded. [7]

(n) "Planned renovation" means a renovation operation, or a number of such operations, in which the amount of friable asbestos material that will be removed or stripped within a given period of time can be predicted. Operations that are individually non-scheduled are included, provided a number of such operations can be predicted to occur during a given period of time based on operating experience. [7]

(o) "Emergency renovation" means a renovation operation that results from a sudden, unexpected event, and is not a planned renovation. Operations necessitated by non-routine failures of equipment are included. [7]

(p) "Adequately wetted" means sufficiently mixed or coated with water or an aqueous solution to prevent dust emissions. [7]

(q) "Removing" means taking out friable asbestos materials used to insulate or fireproof any pipe, duct, boiler, tank, reactor, turbine, furnace, or structural member from any building, structure, facility, or installation. [7]

(r) "Stripping" means taking off friable asbestos materials used for insulation or fireproofing from any pipe, duct, boiler, tank, reactor, turbine, furnace, or structural member. [7]

(s) "Fabricating" means any processing of a manufactured product containing commercial asbestos, with the exception of processing at temporary sites for the construction or restoration of buildings, structures, facilities or installations. [7]

(t) "Inactive waste disposal site" means any disposal site or portion thereof where additional asbestos-containing waste material will not be deposited and where the surface is not disturbed by vehicular traffic. [7]

(u) "Active waste disposal site" means any disposal site other than an inactive site. [7]

(v) "Roadways" means surfaces on which motor vehicles travel including, but not limited to, highways, roads, streets, parking areas, and driveways. [7]

(w) "Asbestos-containing waste material" means any waste which contains commercial asbestos and is generated by a source subject to the provisions of this subpart, including asbestos mill tailings, control device asbestos waste, friable asbestos waste material, and bags or containers that previously contained commercial asbestos. [7]

(x) "Structural member" means any load-supporting member, such as beams and load-supporting walls; or any nonload-supporting member, such as ceilings and non-load-supporting walls. [36]

§ 61.22 Emission standard.

(a) Asbestos mills: There shall be no visible emissions to the outside air from any asbestos mill except as provided in paragraph (f) of this section. [2]

(b) Roadways: The surfacing of roadways with asbestos tailings or with asbestos-containing waste that is generated by any source subject to paragraphs (c), (d), (e) or (h) of this section is prohibited, except for temporary roadways on an area of asbestos ore deposits. The deposition of asbestos tailings or asbestos-containing waste on roadways covered with snow or ice is considered "surfacing." [7]

(c) Manufacturing: There shall be no visible emissions to the outside air, except as provided in paragraph (f) of this section, from any of the following operations if they use commercial asbestos or from any building or structure in which such operations are conducted. [7]

(1) The manufacture of cloth, cord, wicks, tubing, tape, twine, rope, thread, yarn, roving, lap, or other textile materials.

(2) The manufacture of cement products.

(3) The manufacture of fireproofing and insulating materials.

(4) The manufacture of friction products.

(5) The manufacture of paper, millboard, and felt.

(6) The manufacture of floor tile.

(7) The manufacture of paints, coatings, caulks, adhesives, sealants.

(8) The manufacture of plastics and rubber materials.

(9) The manufacture of chlorine.

(10) The manufacture of shotgun shells. [7]

(11) The manufacture of asphalt concrete. [7]

(d) Demolition and renovation: The requirements of this paragraph shall apply to any owner or operator of a demolition or renovation operation who intends to demolish any institutional, commercial, or industrial building (including apartment buildings having more than four dwelling units), structure, facility, installation, or portion thereof which contains any pipe, duct, boiler, tank, reactor, turbine, furnace, or structural member that is insulated or fireproofed with friable asbestos material, except as provided in paragraph (d)(1) of this section; or who intends to renovate any institutional, commercial, or industrial building, structure, facility, installation, or portion thereof where more than 80 meters (ca. 260 feet) of pipe insulated or fireproofed with friable asbestos material are stripped or removed, or more than 15 square meters (ca. 160 square feet) of friable asbestos material used to insulate or fireproof any duct, boiler, tank, reactor, turbine, furnace, or structural member are stripped or removed. [7]

(1)(i) The owner or operator of a demolition operation is exempted from the requirements of this paragraph provided, (1) the amount of friable asbestos material in the building or portion thereof to be demolished is less than 80 meters (ca. 260 feet) used to insulate pipes, and less than 15 square meters (ca. 160 square feet) used to insulate or fireproof any duct, boiler, tank, reactor, turbine, furnace, or structural member, and (2) the notification requirements of paragraph (d)(1)(ii) are met. [2,7]

(ii) Written notification shall be postmarked or delivered to the Administrator at least 20 days prior to commencement of demolition and shall include the information required by paragraph (d)(2) of this section, with the exception of the information required by paragraphs (d)(2)(iii), (vi), (vii), (viii), and (ix), and shall state the measured or estimated amount of friable asbestos material used for insulation and fireproofing which is present. Techniques of estimation shall be explained. [2,7]

(2) Written notice of intention to demolish or renovate shall be provided to the Administrator by the owner or operator of the demolition or renovation oper-

ation. Such notice shall be postmarked or delivered to the Administrator at least 10 days prior to commencement of demolition, or as early as possible prior to commencement of emergency demolition subject to paragraph (d)(6) of this section, and as early as possible prior to commencement of renovation. Such notice shall include the following information:

(i) Name of owner or operator.

(ii) Address of owner or operator.

(iii) Description of the building, structure, facility, or installation to be demolished or renovated, including the size, age, and prior use of the structure, and the approximate amount of friable asbestos material used for insulation and fireproofing.

(iv) Address or location of the building, structure, facility, or installation.

(v) Scheduled starting and completion dates of demolition or renovation.

(vi) Nature of planned demolition or renovation and method(s) to be employed.

(vii) Procedures to be employed to meet the requirements of this paragraph and paragraph (j) of this section.

(viii) The name and address or location of the waste disposal site where the friable asbestos waste will be deposited.

(ix) Name, title, and authority of the State or local governmental representative who has ordered a demolition which is subject to paragraph (d)(6) of this section.

(3)(i) For purposes of determining whether a planned renovating operation constitutes a renovation within the meaning of this paragraph, the amount of friable asbestos material to be removed or stripped shall be:

(A) For planned renovating operations involving individually non-scheduled operations, the additive amount of friable asbestos material that can be predicted will be removed or stripped at a source over the maximum period of time for which a prediction can be made. The period shall be not less than 30 days and not longer than one year.

(B) For each planned renovating operation not covered by paragraph (d)(3)(i)(A), the total amount of friable asbestos material that can be predicted will be removed or stripped at a source.

(ii) For purposes of determining whether an emergency renovating operation constitutes a renovation within the meaning of this paragraph, the amount of friable asbestos material to be removed or stripped shall be the total amount of friable asbestos material that will be removed or stripped as a result of the sudden, unexpected event that necessitated the renovation.

(4) The following procedures shall be used to prevent emissions of particulate asbestos material to outside air:

(i) Friable asbestos materials, used to insulate or fireproof any pipe, duct, boiler, tank, reactor, turbine, furnace, or structural member, shall be removed from any building, structure, facility or installation subject to this paragraph. Such removal shall occur before wrecking or dismantling of any portion of such building, structure, facility, or installation that would break up the friable asbestos materials and before wrecking or dismantling of any other portion of such building, structure, facility, or installation that would preclude access to such materials for subsequent removal. Removal of friable asbestos materials used for insulation or fireproofing of any pipe, duct, or structural member which are encased in concrete or other similar structural material is not required prior to demolition, but such material shall be adequately wetted whenever exposed during demolition.

(ii) Friable asbestos materials used to insulate or fireproof pipes, ducts, boilers, tanks, reactors, turbines, furnaces, or structural members shall be adequately wetted during stripping, except as provided in paragraphs (d)(4)(iv), (d)(4)(vi) or (d)(4)(vii) of this section.

(iii) Pipes, ducts, boilers, tanks, reactors, turbines, furnaces, or structural members that are insulated or fireproofed with friable asbestos materials may be taken out of any building, structure, facility, or installation subject to this paragraph as units or in sections provided the friable asbestos materials exposed during cutting or disjointing are adequately wetted during the cutting or disjointing operation. Such units shall not be dropped or thrown to the ground, but shall be carefully lowered to ground level.

(iv) The stripping of friable asbestos materials used to insulate or fireproof any pipe, duct, boiler, tank, reactor, turbine, furnace, or structural member that has been removed as a unit or in sections as provided in paragraph (d)(4)(iii) of this section shall be performed in accordance with paragraph (d)(4)(ii) of this section. Rather than comply with the wetting requirement, a local exhaust ventilation and collection system may be used to prevent emissions to the outside air. Such local exhaust ventilation systems shall be designed and operated to capture the asbestos particulate matter produced by the stripping of friable asbestos material. There shall be no visible emissions to the outside air from such local exhaust ventilation and collection systems except as provided in paragraph (f) of this section.

(v) All friable asbestos materials that have been removed or stripped shall be adequately wetted to ensure that such materials remain wet during all remaining stages of demolition or renovation and related handling operations. Such materials shall not be dropped or thrown to the ground or a lower floor. Such materials that have been removed or stripped more than 50 feet above ground level, except those materials removed as units or in sections, shall be transported to the ground via dust-tight chutes or containers.

(vi) Except as specified below, the wetting requirements of this paragraph are suspended when the temperature at the point of wetting is below 0°C (32°F). When friable asbestos materials are not wetted due to freezing temperatures, such materials on pipes, ducts, boilers, tanks, reactors, turbines, furnaces, or structural members shall, to the maximum extent possible, be removed as units or in sections prior to wrecking. In no case shall the requirements of paragraphs (d)(4)(iv) or (d)(4)(v) be suspended due to freezing temperatures.

(vii) For renovation operations, local exhaust ventilation and collection systems may be used, instead of wetting as specified in paragraph (d)(4)(ii), to prevent emissions of particulate asbestos material to outside air when damage to equipment resulting from the wetting would be unavoidable. Upon request and supply of adequate information, the Administrator will determine whether damage to equipment resulting from wetting to comply with the provisions of this paragraph would be unavoidable. Such local exhaust ventilation systems shall be designed and operated to capture the asbestos particulate matter produced by the stripping and removal of friable asbestos material. There shall be no visible emissions to the outside air from such local exhaust ventilation and collection systems, except as provided in paragraph (f) of this section. [2,7]

(5) Sources subject to this paragraph are exempt from the requirements of §§ 61.05(a), 61.07, and 61.09.

(6) The demolition of a building, structure, facility, or installation, pursuant to an order of an authorized representative of a State or local governmental agency, issued because that building is structurally unsound and in danger of imminent collapse is exempt from all but the following requirements of paragraph (d) of this section:

(i) The notification requirements specified by paragraph (d)(2) of this section;

(ii) The requirements on stripping of friable asbestos materials from previously removed units or sections as specified in paragraph (d)(4)(iv) of this section;

(iii) The wetting, as specified by paragraph (d)(4)(v) of this section, of friable asbestos materials that have been removed or stripped;

(iv) The portion of the structure being demolished that contains friable asbestos materials shall be adequately wetted during the wrecking operation. [7]

(e) Spraying: There shall be no visible emissions to the outside air from the spray-on application of materials containing more than 1 percent asbestos, on a dry weight basis, used to insulate or fireproof equipment and machinery, except as provided in paragraph (f) of this section. Spray-on materials used to insulate or fireproof buildings, structures, pipes, and conduits shall contain less than 1 percent asbestos on a dry weight basis.

(1) Sources subject to this paragraph are exempt from the requirements of § 61.05(a), § 61.07, and § 61.09..

(2) Any owner or operator who intends to spray asbestos materials which contain more than 1 percent asbestos on a dry weight basis to insulate or fireproof equipment and machinery shall report such intention to the Administrator at least 20 days prior to the commencement of the spraying operation. Such report shall include the following information:[7]

(i) Name of owner or operator.

(ii) Address of owner or operator.

(iii) Location of spraying operation.

(iv) Procedures to be followed to meet the requirements of this paragraph.

(f) Rather than meet the no-visible-emission requirements as specified by paragraphs (a), (c), (d), (e), (h), (j), and (k) of this section, an owner or operator may elect to use the methods specified by § 61.23 to clean emissions containing particulate asbestos material before such emissions escape to, or are vented to, the outside air.

(g) Where the presence of uncombined water is the sole reason for failure to meet the no-visible-emission requirement of paragraphs (a), (c), (d), (e), (h), (j), or (k) of this section, such failure shall not be a violation of such emission requirements.[2,7]

(h) Fabricating: There shall be no visible emissions to the outside air, except as provided in paragraph (f) of this section, from any of the following operations if they use commercial asbestos or from any building or structure in which such operations are conducted.

(1) The fabrication of cement building products.

(2) The fabrication of friction products, except those operations that primarily install asbestos friction materials on motor vehicles.

(3) The fabrication of cement or silicate board for ventilation hoods; ovens; electrical panels; laboratory furniture; bulkheads, partitions and ceilings for marine construction; and flow control devices for the molten metal industry.

(i) Insulating: Molded insulating materials which are friable and wet-applied insulating materials which are friable after drying, installed after the effective date of these regulations, shall contain no commercial asbestos. The provisions of this paragraph do not apply to insulating materials which are spray applied; such materials are regulated under § 61.22(e).

(j) Waste disposal for manufacturing, fabricating, demolition, renovation and spraying operations: The owner or operator of any source covered under the provisions of paragraphs (c), (d), (e), or (h) of this section shall meet the following standards:

(1) There shall be no visible emissions to the outside air, except as provided in paragraph (j)(3) of this section, during the collection; processing, including incineration; packaging; transporting; or deposition of any asbestos-containing waste material which is generated by such source.

(2) All asbestos-containing waste material shall be deposited at waste disposal sites which are operated in accordance with the provisions of § 61.25.

(3) Rather than meet the requirement of paragraph (j)(1) of this section, an owner or operator may elect to use either of the disposal methods specified under (j)(3)(i) and (ii) of this section, or an alternative disposal method which has received prior approval by the Administrator:

(i) Treatment of asbestos-containing waste material with water:

(A) Control device asbestos waste shall be thoroughly mixed with water into a slurry and other asbestos-containing waste material shall be adequately wetted. There shall be no visible emissions to the outside air from the collection, mixing and wetting operations, except as provided in paragraph (f) of this section.

(B) After wetting, all asbestos-containing waste material shall be sealed into leak-tight containers while wet, and such containers shall be deposited at waste disposal sites which are operated in accordance with the provisions of § 61.25.

(C) The containers specified under paragraph (j)(3)(i)(B) of this section shall be labeled with a warning label that states:

CAUTION

Contains Asbestos
Avoid Opening or Breaking Container
Breathing Asbestos is Hazardous
to Your Health

Alternatively, warning labels specified by Occupational Safety and Health Standards of the Department of Labor, Occupational Safety and Health Administration (OSHA) under 29 CFR 1910.93a(g)(2)(ii) may be used.

(ii) Processing of asbestos-containing waste material into non-friable forms:

(A) All asbestos-containing waste material shall be formed into non-friable pellets or other shapes and deposited at waste disposal sites which are operated in accordance with the provisions of § 61.25.

(B) There shall be no visible emissions to the outside air from the collection and processing of asbestos-containing waste material, except as specified in paragraph (f) of this section.

(4) For the purposes of this paragraph (j), the term all asbestos-containing waste material as applied to demolition and renovation operations covered by paragraph (d) of this section includes only friable asbestos waste and control device asbestos waste.

(k) Waste disposal for asbestos mills: The owner or operator of any source covered under the provisions of paragraph (a) of this section shall meet the following standard:

(1) There shall be no visible emissions to the outside air, except as provided in paragraph (k)(3) of this section, during the collection, processing, packaging, transporting or deposition of any asbestos-containing waste material which is generated by such source.

(2) All asbestos-containing waste material shall be deposited at waste disposal sites which are operated in accordance with the provisions of § 61.25.

(3) Rather than meet the requirement of paragraph (k)(1) of this section, an owner or operator may elect to meet the following requirements in paragraphs (k)(3)(i) and (ii), or use an alternative disposal method which has received prior approval by the Administrator:

(i) There shall be no visible emissions to the outside air from the transfer of control device asbestos waste to the tailings conveyor, except as provided in paragraph (f) of this section. Such waste shall be subsequently processed either as specified in paragraph (k)(3)(ii) of this section or as specified in paragraph (j)(3) of this section.

(ii) All asbestos-containing waste material shall be adequately mixed, with a wetting agent recommended by the manufacturer of the agent to effectively wet dust and tailings, prior to deposition at a waste disposal site. Such agent shall be used as recommended for the particular dust by the manufacturer of the agent. There shall be no discharge of visible emissions to the outside air from the wetting operation except as specified in paragraph (f) of this section. Wetting may be suspended when the ambient temperature at the waste disposal site is less than −9.5°C (ca. 15°F). The ambient air temperature shall be determined by an appropriate measurement method with an accuracy of ±1°C (±2°F) and recorded at least at hourly intervals during the period that the operation of the wetting system is suspended. Records of such temperature measurements shall be retained at the source for a minimum of two years and made available for inspection by the Administrator.

(l) The owner of any inactive waste disposal site, which was operated by sources covered under § 61.22 (a), (c) or (h) and where asbestos-containing waste material produced by such sources was deposited, shall meet the following standards:

(1) There shall be no visible emissions to the outside air from an inactive waste disposal site subject to this paragraph, except as provided in paragraph (l)(5) of this section.

(2) Warning signs shall be displayed at all entrances, and along the property line of the site or along the perimeter of the sections of the site where asbestos-containing waste material was deposited, at intervals of 100 m (ca. 330 ft) or less, except as specified in paragraph (l)(4) of this section. Signs shall be posted in such a manner and location that a person may easily read the legend. The warning signs required by this paragraph shall conform to the requirements of 20″ x 14″ upright format signs specified in 29 CFR 1910.145(d)(4) and this paragraph. The signs shall display the following legend in the lower panel, with letter sizes and styles of a visibility at least equal to those specified in this paragraph.

LEGEND	
ASBESTOS WASTE DISPOSAL SITE	
Do Not Create Dust	
Breathing Asbestos is Hazardous to Your Health	

Notation
1″ Sans Serif, Gothic or Block
¾″ Sans Serif, Gothic or Block
14 Point Gothic

Spacing between lines shall be at least equal to the height of the upper of the two lines.

(3) The perimeter of the site shall be fenced in a manner adequate to deter access by the general public, except as specified in paragraph (l)(4) of this section.

(4) Warning signs and fencing are not required where the requirements of

paragraphs (l)(5) (i) or (ii) of this section are met, or where a natural barrier adequately deters access by the general public. Upon request and supply of appropriate information, the Administrator will determine whether a fence or a natural barrier adequately deters access to the general public.

(5) Rather than meet the requirement of paragraph (l)(1) of this section, an owner may elect to meet the requirements of this paragraph or may use an alternative control method for emissions from inactive waste disposal sites which has received prior approval by the Administrator.

(i) The asbestos-containing waste material shall be covered with at least 15 centimeters (ca. 6 inches) of compacted non-asbestos-containing material, and a cover of vegetation shall be grown and maintained on the area adequate to prevent exposure of the asbestos-containing waste material; or

(ii) The asbestos-containing waste material shall be covered with at least 60 centimeters (ca. 2 feet) of compacted non-asbestos-containing material and maintained to prevent exposure of the asbestos-containing waste; or

(iii) For inactive waste disposal sites for asbestos tailings, a resinous or petroleum-based dust suppression agent which effectively binds dust and controls wind erosion shall be applied. Such agent shall be used as recommended for the particular asbestos tailings by the dust suppression agent manufacturer. Other equally effective dust suppression agents may be used upon prior approval by the Administrator. For purposes of this paragraph, waste crankcase oil is not considered a dust suppression agent. [7]

§ 61.23 Air-Cleaning.

If air-cleaning is elected, as permitted by §§ 61.22(f) and 61.22(d)(4)(iv), the requirements of this section must be met. [7]

(a) Fabric filter collection devices must be used, except as noted in paragraphs (b) and (c) of this section. Such devices must be operated at a pressure drop of no more than 4 inches water gage, as measured across the filter fabric. The airflow permeability, as determined by ASTM method D737–69, must not exceed 30 ft^3/min/ft^2 for woven fabrics or 35 ft^3/min/ft^2 for felted fabrics, except that 40 ft^3/min/ft^2 for woven and 45 ft^3/min/ft^2 for felted fabrics is allowed for filtering air from asbestos ore dryers. Each square yard of felted fabric must weigh at least 14 ounces and be at least one-sixteenth inch thick throughout. Synthetic fabrics must not contain fill yarn other than that which is spun.

(b) If the use of fabric filters creates a fire or explosion hazard, the administrator may authorize the use of wet collectors designed to operate with a unit contacting energy of at least 40 inches water gage pressure.

(c) The administrator may authorize the use of filtering equipment other than that described in paragraphs (a) and (b) of this section if the owner or operator demonstrates to the satisfaction of the administrator that the filtering of particulate asbestos material is equivalent to that of the described equipment.

(d) All air-cleaning equipment authorized by this section must be properly installed, used, operated, and maintained. Bypass devices may be used only during upset or emergency conditions and then only for so long as it takes to shut down the operation generating the particulate asbestos material.

§ 61.24 Reporting.

The owner or operator of any existing source to which this subpart is applicable shall, within 90 days after the effective date, provide the following information to the administrator:

(a) A description of the emission control equipment used for each process;

(b) If a fabric filter device is used to control emissions, the pressure drop across the fabric filter in inches water gage.

(1) If the fabric filter device utilizes a woven fabric, the airflow permeability in ft^3/min/ft^2; and, if the fabric is synthetic, indicate whether the fill yarn is spun or not spun.

(2) If the fabric filter device utilizes a felted fabric, the density in oz/yd^2, the minimum thickness in inches, and the airflow permeability in ft^3/min/ft^2.

(c) For sources subject to §§ 61.22(j) and 61.22(k):

(1) A brief description of each process that generates asbestos-containing waste material.

(2) The average weight of asbestos-containing waste material disposed of, measured in kg/day.

(3) The emission control methods used in all stages of waste disposal.

(4) The type of disposal site or incineration site used for ultimate disposal, the name of the site operator, and the name and location of the disposal site. [7]

(d) For sources subject to § 61.22(l):

(1) A brief description of the site.

(2) The method or methods used to comply with the standard, or alternative procedures to be used. [7]

(e) Such information shall accompany the information required by § 61.10. The information described in this section shall be reported using the format of Appendix A of this part. [7]

§ 61.25 Waste disposal sites. [7]

In order to be an acceptable site for disposal of asbestos-containing waste material under § 61.22 (j) and (k), an active waste disposal site shall meet the requirements of this section.

(a) There shall be no visible emissions to the outside air from any active waste disposal site where asbestos-containing waste material has been deposited, except as provided in paragraph (e) of this section.

(b) Warning signs shall be displayed at all entrances, and along the property line of the site or along the perimeter of the sections of the site where asbestos-containing waste material is deposited, at intervals of 100 m (ca. 330 ft) or less except as specified in paragraph (d) of this section. Signs shall be posted in such a manner and location that a person may easily read the legend. The warning signs required by this paragraph shall conform to the requirements of 20" x 14" upright format signs specified in 29 CFR 1910.145(d)(4) and this paragraph. The signs shall display the following legend in the lower panel, with letter sizes and styles of a visibility at least equal to those specified in this paragraph.

LEGEND	Notation
ASBESTOS WASTE DISPOSAL SITE	1" Sans Serif, Gothic or Block
Do Not Create Dust	¾" Sans Serif, Gothic or Block
Breathing Asbestos is Hazardous to Your Health	14 Point Gothic

Spacing between lines shall be at least equal to the height of the upper of the two lines.

(c) The perimeter of the disposal site shall be fenced in order to adequately deter access to the general public except as specified in paragraph (d) of this section.

(d) Warning signs and fencing are not required where the requirements of paragraph (e)(1) of this section are met, or where a natural barrier adequately deters access to the general public. Upon request and supply of appropriate information, the Administrator will determine whether a fence or a natural barrier adequately deters access to the general public.

(e) Rather than meet the requirement of paragraph (a) of this section, an owner or operator may elect to meet the requirements of paragraph (e)(1) or (e)(2) of this section, or may use an alternative control method for emissions from active waste disposal sites which has received prior approval by the Administrator.

(1) At the end of each operating day, or at least once every 24-hour period while the site is in continuous operation, the asbestos-containing waste material which was deposited at the site during the operating day or previous 24-hour period shall be covered with at least 15 centimeters (ca. 6 inches) of compacted non-asbestos-containing material.

(2) At the end of each operating day, or at least once every 24-hour period while the disposal site is in continuous operation, the asbestos-containing waste material which was deposited at the site during the operating day or previous 24-hour period shall be covered with a resinous or petroleum-based dust suppression agent which effectively binds dust and controls wind erosion. Such agent shall be used as recommended for the particular dust by the dust suppression agent manufacturer. Other equally effective dust suppression agents may be used upon prior approval by the Administrator. For purposes of this paragraph, waste crankcase oil is not considered a dust suppression agent.

Subpart C—National Emission Standard for Beryllium

§ 61.30 Applicability.

The provisions of this subpart are applicable to the following stationary sources:

(a) Extraction plans, ceramic plants, foundries, incinerators, and propellant plants which process beryllium ore, beryllium, beryllium oxide, beryllium alloys, or beryllium-containing waste.

(b) Machine shops which process beryllium, beryllium oxides, or any alloy when such alloy contains more than 5 percent beryllium by weight.

§ 61.31 Definitions.

Terms used in this subpart are defined in the act, in subpart A of this part, or in this section as follows:

(a) "Beryllium" means the element beryllium. Where weights or concentrations are specified, such weights or concentrations apply to beryllium only, excluding the weight or concentration of any associated elements.

(b) "Extraction plant" means a facility chemically processing beryllium ore to beryllium metal, alloy, or oxide, or performing any of the intermediate steps in these processes.

(c) "Beryllium ore" means any naturally occurring material mined or gathered for its beryllium content.

(d) "Machine shop" means a facility performing cutting, grinding, turning, honing, milling, deburring, lapping, electrochemical machining, etching, or other similar operations.

(e) "Ceramic plant" means a manufacturing plant producing ceramic items.

(f) "Foundry" means a facility engaged in the melting or casting of beryllium metal or alloy.

(g) "Beryllium-containing waste" means material contaminated with beryllium and/or beryllium compounds used or generated during any process or operation performed by a source subject to this subpart.

(h) "Incinerator" means any furnace used in the process of burning waste for the primary purpose of reducing the volume of the waste by removing combustible matter.

(i) "Propellant" means a fuel and oxidizer physically or chemically combined which undergoes combustion to provide rocket propulsion.

(j) "Beryllium alloy" means any metal to which beryllium has been added in order to increase its beryllium content and which contains more than 0.1 percent beryllium by weight.

(k) "Propellant plant" means any facility engaged in the mixing, casting, or machining of propellant.

§ 61.32 Emission standard.

(a) Emissions to the atmosphere from stationary sources subject to the provisions of this subpart shall not exceed 10 grams of beryllium over a 24-hour period, except as provided in paragraph (b) of this section.

(b) Rather than meet the requirement of paragraph (a) of this section, an owner or operator may request approval from the Administrator to meet an ambient concentration limit on beryllium in the vicinity of the stationary source of 0.01 $\mu g/m^3$, averaged over a 30-day period.

(1) Approval of such requests may be granted by the Administrator provided that:

(i) At least 3 years of data is available which in the judgment of the Administrator demonstrates that the future ambient concentrations of beryllium in the vicinity of the stationary source will not exceed 0.01 $\mu g/m^3$, averaged over a 30-day period. Such 3-year period shall be the 3 years ending 30 days before the effective date of this standard.

(ii) The owner or operator requests such approval in writing within 30 days after the effective date of this standard.

(iii) The owner or operator submits a report to the Administrator within 45 days after the effective date of this standard which report includes the following information:

(*a*) Description of sampling method including the method and frequency of calibration.

(*b*) Method of sample analysis.

(*c*) Averaging technique for determining 30-day average concentrations.

(*d*) Number, identity, and location (address, coordinates, or distance and heading from plant) of sampling sites.

(*e*) Ground elevations and height above ground of sampling inlets.

(*f*) Plant and sampling area plots showing emission points and sampling sites. Topographic features significantly affecting dispersion including plant building heights and locations shall be included.

(*g*) Information necessary for estimating dispersion including stack height, inside diameter, exit gas temperature, exit velocity or flow rate, and beryllium concentration.

(*h*) A description of data and procedures (methods or models) used to design the air sampling network (i.e., number and location of sampling sites).

(*i*) Air sampling data indicating beryllium concentrations in the vicinity of the stationary source for the 3-year period specified in paragraph (b)(1) of this section. This data shall be presented chronologically and include the beryllium concentration and location of each individual sample taken by the network and the corresponding 30-day average beryllium concentrations.

(2) Within 60 days after receiving such report, the Administrator will notify the owner or operator in writing whether approval is granted or denied. Prior to denying approval to comply with the provisions of paragraph (b) of this section, the Administrator will consult with representatives of the stationary source for which the demonstration report was submitted.

(c) The burning of beryllium and/or beryllium-containing waste, except propellants, is prohibited except in incinerators, emissions from which must comply with the standard.

§ 61.33 Stack sampling.

(a) Unless a waiver of emission testing is obtained under § 61.13, each owner or operator required to comply with § 61.32(a) shall test emissions from his source,

(1) Within 90 days of the effective date in the case of an existing source or a new source which has an initial startup date preceding the effective date; or

(2) Within 90 days of startup in the case of a new source which did not have an initial startup date preceding the effective date.

(b) The Administrator shall be notified at least 30 days prior to an emission test so that he may at his option observe the test.

(c) Samples shall be taken over such a period or periods as are necessary to accurately determine the maximum emissions which will occur in any 24-hour period. Where emissions depend upon the relative frequency of operation of different types of processes, operating hours, operating capacities, or other factors, the calculation of maximum 24-hour-period emissions will be based on that combination of factors which is likely to occur during the subject period and which result in the maximum emissions. No changes in the operation shall be made, which would potentially increase emissions above that determined by the most recent source test, until a new emission level has been estimated by calculation and the results reported to the Administrator.

(d) All samples shall be analysed and beryllium emissions shall be determined within 30 days after the source test. All determinations shall be reported to the Administrator by a registered letter dispatched before the close of the next business day following such determination.

(e) Records of emission test results and other data needed to determine total emissions shall be retained at the source and made available, for inspection by the Administrator, for a minimum of 2 years.

§ 61.34 Air sampling.

(a) Stationary sources subject to § 61.32(b) shall locate air sampling sites in accordance with a plan approved by the Administrator. Such sites shall be located in such a manner as is calculated to detect maximum concentrations of beryllium in the ambient air.

(b) All monitoring sites shall be operated continuously except for a reasonable time allowance for instrument maintenance and calibration, for changing filters, or for replacemet of equipment needing major repair.

(c) Filters shall be analyzed and concentrations calculated within 30 days after filters are collected. Records of concentrations at all sampling sites and other data needed to determine such concentrations shall be retained at the source and made available, for inspection by the Administrator, for a minimum of 2 years.

(d) Concentrations measured at all sampling sites shall be reported to the Administrator every 30 days by a registered letter.

(e) The Administrator may at any time require changes in, or expansion of, the sampling network.

Subpart D—National Emission Standard for Beryllium Rocket Motor Firing

§ 61.40 Applicability.

The provisions of this subpart are applicable to rocket motor test sites.

§ 61.41 Definitions.

Terms used in this subpart are defined in the Act, in Subpart A of this part, or in this section as follows:

(a) "Rocket motor test site" means any building, structure, facility, or installation where the static test firing of a beryllium rocket motor and/or the disposal of beryllium propellant is conducted.

(b) "Beryllium propellant" means any propellant incorporating beryllium.

§ 61.42 Emission standard.

(a) Emissions to the atmosphere from rocket-motor test sites shall not cause time-weighted atmospheric concentrations of beryllium to exceed 75 microgram minutes per cubic meter of air within the limits of 10 to 60 minutes, accumulated during any 2 consecutive weeks, in any area in which an effect adverse to public health could occur.

(b) If combustion products from the firing of beryllium propellant are collected in a closed tank, emissions from such tank shall not exceed 2 grams per hour and a maximum of 10 grams per day.

§ 61.43 Emission testing—rocket firing or propellant disposal.

(a) Ambient air concentrations shall be measured during and after firing of a rocket motor or propellant disposal and in such a manner that the effect of these emissions can be compared with the standard. Such sampling techniques shall be approved by the Administrator.

(b) All samples shall be analyzed and results shall be calculated within 30 days after samples are taken and before any subsequent rocket motor firing or propellant disposal at the given site. All results shall be reported to the Administrator by a registered letter dispatched before the close of the next business day following determination of such results.

(c) Records of air sampling test results and other data needed to determine integrated intermittent concentrations shall be retained at the source and made available, for inspection by the Administrator, for a minimum of 2 years.

(d) The Administrator shall be notified at least 30 days prior to an air sampling test, so that he may at his option observe the test.

§ 61.44 Stack sampling.

(a) Sources subject to § 61.42(b) shall be continuously sampled, during release of combustion products from the tank, in such a manner that compliance with the standards can be determined. The provisions of § 61.14 shall apply.

(b) All samples shall be analyzed, and beryllium emissions shall be determined within 30 days after samples are taken and before any subsequent rocket motor firing or propellant disposal at the given site. All determinations shall be reported to the Administrator by a registered letter dispatched before the close of the next business day following such determinations.

(c) Records of emission test results and other data needed to determine total emissions shall be retained at the source and made available, for inspection by the Administrator, for a minimum of 2 years.

(d) The Administrator shall be notified at least 30 days prior to an emission test, so that he may at his option observe the test.

Subpart E—National Emission Standard for Mercury

§ 61.50 Applicability. [7]

The provisions of this subpart are applicable to those stationary sources which process mercury ore to recover mercury, use mercury chlor-alkali cells to produce chlorine gas and alkali metal hydroxide, and incinerate or dry wastewater treatment plant sludge.

§ 61.51 Definitions.

Terms used in this subpart are defined in the act, in subpart A of this part, or in this section as follows:

(a) "Mercury" means the element mercury, excluding any associated elements, and includes mercury in particulates, vapors, aerosols, and compounds.

(b) "Mercury ore" means a mineral mined specifically for its mercury content.

(c) "Mercury ore processing facility" means a facility processing mercury ore to obtain mercury.

(d) "Condenser stack gases" mean the gaseous effluent evolved from the stack of processes utilizing heat to extract mercury metal from mercury ore.

(e) "Mercury chlor-alkali cell" means a device which is basically composed of an electrolyzer section and a denuder (decomposer) section and utilizes mercury to produce chlorine gas, hydrogen gas, and alkali metal hydroxide.

(f) "Mercury chlor-alkali electrolyzer" means an electrolytic device which is part of a mercury chlor-alkali cell and utilizes a flowing mercury cathode to produce chlorine gas and alkali metal amalgam.

(g) "Denuder" means a horizontal or vertical container which is part of a mercury chlor-alkali cell and in which water and alkali metal amalgam are converted to alkali metal hydroxide, mercury, and hydrogen gas in a short-circuited, electrolytic reaction.

(h) "Hydrogen gas stream" means a hydrogen stream formed in the chlor-alkali cell denuder.

(i) "End box" means a container(s) located on one or both ends of a mercury chlor-alkali electrolyzer which serves as a connection between the electrolyzer and denuder for rich and stripped amalgam.

(j) "End box ventilation system" means a ventilation system which collects mercury emissions from the end-boxes, the mercury pump sumps, and their water colection systems.

(k) "Cell room" means a structure(s) housing one or more mercury electrolytic chlor-alkali cells.

(l) "Sludge" means sludge produced by a treatment plant that processes municipal or industrial waste waters. [7]

(m) "Sludge dryer" means a device used to reduce the moisture content of sludge by heating to temperatures above 65°C (ca. 150°F) directly with combustion gases. [7]

§ 61.52 Emission standard. [7]

(a) Emissions to the atmosphere from mercury ore processing facilities and mercury cell chlor-alkali plants shall not exceed 2300 grams of mercury per 24-hour period.

(b) Emissions to the atmosphere from sludge incineration plants, sludge drying plants, or a combination of these that process wastewater treatment plant sludges shall not exceed 3200 grams of mercury per 24-hour period.

§ 61.53 Stack sampling.

(a) Mercury ore processing facility.

(1) Unless a waiver of emission testing is obtained under § 61.13, each owner or operator processing mercury ore shall test emissions from his source,

(i) Within 90 days of the effective date in the case of an existing source or a new source which has an initial startup date preceding the effective date; or

(ii) Within 90 days of startup in the case of a new source which did not have an initial startup date preceding the effective date.

(2) The Administrator shall be notified at least 30 days prior to an emission test, so that he may at his option observe the test.

(3) Samples shall be taken over such a period or periods as are necessary to accurately determine the maximum emissions which will occur in a 24-hour period. No changes in the operation shall be made, which would potentially increase emissions above that determined by the most recent source test, until the new emission level has been estimated by calculation and the results reported to the Administrator.

(4) All samples shall be analyzed, and mercury emissions shall be determined within 30 days after the source test. Each determination will be reported to the Administrator by a registered letter dispatched before the close of the next business day following such determination.

(5) Records of emission test results and other data needed to determine total emissions shall be retained at the source and made available, for inspection by the Administrator, for a minimum of 2 years.

(b) Mercury chlor-alkali plant—hydrogen and end-box ventilation gas streams.

(1) Unless a waiver of emission testing is obtained under § 61.13, each owner or operator employing mercury chlor-alkali cell(s) shall test emissions from his source,

(i) Within 90 days of the effective date in the case of an existing source or a new source which has an initial startup date preceding the effective date; or

(ii) Within 90 days of startup in the case of a new source which did not have an initial startup date preceding the effective date.

(2) The Administrator shall be notified at least 30 days prior to an emission test, so that he may at his option observe the test.

(3) Samples shall be taken over such a period or periods as are necessary to accurately determine the maximum emissions which will occur in a 24-hour period. No changes in the operation shall be made, which would potentially increase emissions above that determined by the most recent source test, until the new emission has been estimated by calculation and the results reported to the Administrator.

(4) All samples shall be analyzed and mercury emisions shall be determined within 30 days after the source test. All the determinations will be reported to the Administrator by a registered letter dispatched before the close of the next business day following such determination.

(5) Records of emission test results and other data needed to determine total emissions shall be retained at the source and made available, for inspection by the Administrator, for a minimum of 2 years.

(c) Mercury chlor-alkali plants—cell room ventilation system.

(1) Stationary sources using mercury chlor-alkali cells may test cell room emissions in accordance with paragraph (c)(2) of this section or demonstrate compliance with paragraph (c)(4) of this section and assume ventilation emissions of 1,300 gms/day of mercury.

(2) Unless a waiver of emission testing is obtained under § 61.13, each owner or operator shall pass all cell room air in forced gas streams through stacks suitable for testing,

(i) Within 90 days of the effective date in the case of an existing source or a new source which has an initial startup date preceding the effective date; or

(ii) Within 90 days of startup in the case of a new source which did not have an initial startup date preceding the effective date.

(3) The Administrator shall be notified at least 30 days prior to an emission test, so that he may at his option observe the test.

(4) An owner or operator may carry out approved design, maintenance, and housekeeping practices. A list of approved design, maintenance, and housekeeping practices may be obtained from the Administrator.

(d) Sludge incineration and drying plants.

(1) Unless a waiver of emission testing is obtained under § 61.13, each owner or operator of a source subject to the standard in § 61.52(b) shall test emissions from that source. Such tests shall be conducted in accordance with the procedures set forth either in paragraph (d) of this section or in § 61.54.

(2) Method 101 in Appendix B to this part shall be used to test emissions as follows:

(i) The test shall be performed within 90 days of the effective date of these regulations in the case of an existing source or a new source which has an initial startup date preceding the effective date.

(ii) The test shall be performed within 90 days of startup in the case of a new source which did not have an initial startup date preceding the effective date.

(3) The Administrator shall be notified at least 30 days prior to an emission test, so that he may at his option observe the test.

(4) Samples shall be taken over such a period or periods as are necessary to determine accurately the maximum emissions which will occur in a 24-hour period. No changes shall be made in the operation which would potentially increase emissions above the level determined by the most recent stack test, until the new emission level has been estimated by calculation and the results reported to the Administrator.

(5) All samples shall be analyzed, and mercury emissions shall be determined within 30 days after the stack test. Each determination shall be reported to the Administrator by a registered letter dispatched before the close of the next business day following such determination.

(6) Records of emission test results and other data needed to determine total emissions shall be retained at the source and shall be made available, for inspection by the Administrator, for a minimum of 2 years.[7]

§ 61.54 Sludge sampling.[7]

(a) As an alternative means for demonstrating compliance with § 61.52 (b), an owner or operator may use Method 105 of Appendix B and the procedures specified in this section.

(1) A sludge test shall be conducted within 90 days of the effective date of these regulations in the case of an existing source or a new source which has an initial startup date preceding the effective date; or

(2) A sludge test shall be conducted within 90 days of startup in the case of a new source which did not have an initial startup date preceding the effective date.

(b) The Administrator shall be notified at least 30 days prior to a sludge sampling test, so that he may at his option observe the test.

(c) Sludge shall be sampled according to paragraph (c)(1) of this section, sludge charging rate for the plant shall be determined according to paragraph (c)(2) of this section, and the sludge analysis shall be performed according to paragraph (c)(3) of this section.

(1) The sludge shall be sampled after dewatering and before incineration or drying, at a location that provides a representative sample of the sludge that is charged to the incinerator or dryer. Eight consecutive grab samples shall be obtained at intervals of between 45 and 60 minutes and thoroughly mixed into one sample. Each of the eight grab samples shall have a volume of at least 200 ml but not more than 400 ml. A total of three composite samples shall be obtained within an operating period of 24 hours. When the 24-hour operating period is not continuous, the total sampling period shall not exceed 72 hours after the first grab sample is obtained. Samples shall not be exposed to any condition that may result in mercury contamination or loss.

(2) The maximum 24-hour period sludge incineration or drying rate shall be determined by use of a flow rate measurement device that can measure the mass rate of sludge charged to the incinerator or dryer with an accuracy of ±5 percent over its operating range. Other methods of measuring sludge mass charging rates may be used if they have received prior approval by the Administrator.

(3) The handling, preparation, and analysis of sludge samples shall be accomplished according to Method 105 in Appendix B of this part.

(d) The mercury emissions shall be determined by use of the following equation:

$$E_{Hg}=1 \times 10^{-3} cQ$$

where

E_{Hg}=Mercury emissions, g/day.

c =Mercury concentration of sludge on a dry solids basis, μg/g (ppm).

Q =Sludge charging rate, kg/day.

(e) No changes in the operation of a plant shall be made after a sludge test has been conducted which would potentially increase emissions above the level determined by the most recent sludge test, until the new emission level has been estimated by calculation and the results reported to the Administrator.

(f) All sludge samples shall be analyzed for mercury content within 30 days after the sludge sample is collected. Each determination shall be reported to the Administrator by a registered letter dispatched before the close of the next business day following such determination.

(g) Records of sludge sampling, charging rate determination and other data needed to determine mercury content of wastewater treatment plant sludges shall be retained at the source and made available, for inspection by the Administrator, for a minimum of 2 years.

§ 61.55 Emission monitoring.[7]

(a) Wastewater treatment plant sludge incineration and drying plants. All such sources for which mercury emissions exceed 1600 g/day, demonstrated either by stack sampling according to § 61.53 or sludge sampling according to § 61.54, shall monitor mercury emissions at intervals of at least once per year by use of Method 105 of Appendix B, or the procedures specified in § 61.54(c) and (d). The results of monitoring shall be reported and retained according to § 61.53(d) (5) and (6), or § 61.54(f) and (g).

Subpart F—National Emission Standard for Vinyl Chloride [28]

§ 61.60 Applicability.

(a) This subpart applies to plants which produce:

(1) Ethylene dichloride by reaction of oxygen and hydrogen chloride with ethylene,

(2) Vinyl chloride by any process, and/or

(3) One or more polymers containing any fraction of polymerised vinyl chloride.

(b) This subpart does not apply to equipment used in research and development if the reactor used to polymerise the vinyl chloride processed in the equipment has a capacity of no more than 0.19 m^3 (50 gal).

(c) Sections of this subpart other than § 61.64(a)(1), (b), (c), and (d) do not apply to equipment used in research and development if the reactor used to polymerize the vinyl chloride processed in the equipment has a capacity of greater than 0.19 m^3 (50 gal) and no more than 4.07 m^3 (1100 gal).

§ 61.61 Definitions.

Terms used in this subpart are defined in the Act, in subpart A of this part, or in this section as follows:

(a) "Ethylene dichloride plant" includes any plant which produces ethylene dichloride by reaction of oxygen and hydrogen chloride with ethylene.

(b) "Vinyl chloride plant" includes any plant which produces vinyl chloride by any process.

(c) "Polyvinyl chloride plant" includes any plant where vinyl chloride alone or in combination with other materials is polymerised.

(d) "Slip gauge" means a gauge which has a probe that moves through the gas/liquid interface in a storage or transfer vessel and indicates the level of vinyl chloride in the vessel by the physical state of the material the gauge discharges.

(e) "Type of resin" means the broad classification of resin referring to the basic manufacturing process for producing that resin, including, but not limited to, the suspension, dispersion, latex, bulk, and solution processes.

(f) "Grade of resin" means the subdivision of resin classification which describes it as a unique resin, i.e., the most exact description of a resin with no further subdivision.

(g) "Dispersion resin" means a resin manufactured in such away as to form fluid dispersions when dispersed in a plasticizer or plasticizer/diluent mixtures.

(h) "Latex resin" means a resin which is produced by a polymerization process which initiates from free radical catalyst sites and is sold undried.

(i) "Bulk resin' 'means a resin which is produced by a polymerization process in which no water is used.

(j) "Inprocess wastewater" means any water which, during manufacturing or processing, comes into direct contact with vinyl chloride or polyvinyl chloride or results from the production or use of any raw material, intermediate product, finished product, by-product, or waste product containing vinyl chloride or polyvinyl chloride but which has not been discharged to a wastewater treatment process or discharged untreated as wastewater.

(k) "Wastewater treatment process" includes any process which modifies characteristics such as BOD, COD, TSS, and pH, usually for the purpose of meeting effluent guidelines and standards; it does not include any process the purpose of which is to remove vinyl chloride from water to meet requirements of this subpart.

(l) "In vinyl chloride service" means that a piece of equipment contains or contacts either a liquid that is at least 10 percent by weight vinyl chloride or a gas that is at least 10 percent by volume vinyl chloride.

(m) "Standard operating procedure" means a formal written procedure officially adopted by the plant owner or operator and available on a routine basis to those persons responsible for carrying out the procedure.

(n) "Run" means the net period of time during which an emission sample is collected.

(o) "Ethylene dichloride purification" includes any part of the process of ethylene dichloride production which follows ethylene dichloride formation and in which finished ethylene dichloride is produced.

(p) "Vinyl chloride purification" includes any part of the process of vinyl chloride production which follows vinyl chloride formation and in which finished vinyl chloride is produced.

(q) "Reactor" includes any vessel in which vinyl chloride is partially or totally polymerized into polyvinyl chloride.

(r) "Reactor opening loss" means the emissions of vinyl chloride occurring when a reactor is vented to the atmosphere for any purpose other than an emergency relief discharge as defined in § 61.65(a).

(s) "Stripper" includes any vessel in which residual vinyl chloride is removed from polyvinyl chloride resin, except bulk resin, in the slurry form by the use of heat and/or vacuum. In the case of bulk resin, stripper includes any vessel which is used to remove residual vinyl chloride from polyvinyl chloride resin immediately following the polymerization step in the plant process flow.

§ 61.62 Emission standard for ethylene dichloride plants.

An owner or operator of an ethylene dichloride plant shall comply with the requirements of this section and § 61.65.

(a) Ethylene dichloride purification: The concentration of vinyl chloride in all exhaust gases discharged to the atmosphere from any equipment used in ethylene dichloride purification is not to exceed 10 ppm, except as provided in § 61.65(a). This requirement does not apply to equipment that has been opened, is out of operation, and met the requirement in § 61.65(b) before being opened.

(b) Oxychlorination reactor: Except as provided in § 61.65(a), emissions of vinyl chloride to the atmosphere from each oxychlorination reactor are not to exceed 0.2 g/kg the 100 percent ethylene dichloride product from the oxychlorination process.

§ 61.63 Emission standard for vinyl chloride plants.

An owner or operator of a vinyl chloride plant shall comply with the requirements of this section and § 61.65.

(a) Vinyl chloride formation and purification: The concentration of vinyl chloride in all exhaust gases discharged to the atmosphere from any equipment used in vinyl chloride formation and/or purification is not to exceed 10 ppm, except as provided in § 61.65(a). This requirement does not apply to equipment that has been opened, is out of operation, and met the requirement in § 61.65(b)(6)(i) before being opened.

§ 61.64 Emission standard for polyvinyl chloride plants.

An owner or operator of a polyvinyl chloride plant shall comply with the requirements of this section and § 61.65.

(a) Reactor: The following requirements apply to reactors:

(1) The concentration of vinyl chloride in all exhaust gases discharged to the atmosphere from each reactor is not to exceed 10 ppm, except as provided in paragraph (a)(2) of this section and § 61.65(a).

(2) The reactor opening loss from each reactor is not to exceed 0.02 g vinyl chloride/Kg (0.00002 lb vinyl chloride/lb) of polyvinyl chloride product, with the product determined on a dry solids basis. This requirement applies to any vessel which is used as a reactor or as both a reactor and a stripper. In the bulk process, the product means the gross product of prepolymerization and postpolymerization.

(3) Manual vent valve discharge: Except for an emergency manual vent valve discharge, there is to be no discharge to the atmosphere from any manual vent valve on a polyvinyl chloride reactor in vinyl chloride service. An emergency manual vent valve discharge means a discharge to the atmosphere which could not have been avoided by taking measures to prevent the discharge. Within 10 days of any discharge to the atmosphere from any manual vent valve, the owner or operator of the source from which the discharge occurs shall submit to the Administrator a report in writing containing information on the source, nature and cause of the discharge, the date and time of the discharge, the approximate total vinyl chloride loss during the discharge, the method used for determining the vinyl chloride loss, the action that was taken to prevent the discharge, and measures adopted to prevent future discharges.

(b) Stripper: The concentration of vinyl chloride in all exhaust gases discharged to the atmosphere from each stripper is not to exceed 10 ppm, except as provided in § 61.65(a). This requirement does not apply to equipment that has been opened, is out of operation, and met the requirement in § 61.65(b)(6)(i) before being opened.

(c) Mixing, weighing, and holding containers: The concentration of vinyl chloride in all exhaust gases discharged to the atmosphere from each mixing, weighing, or holding container in vinyl chloride service which precedes the stripper (or the reactor if the plant has no stripper) in the plant process flow is not to exceed 10 ppm, except as provided in § 61.65(a). This requirement does not apply to equipment that has been opened, is out of operation, and met the requirement in § 61.65(b)(6)(i) before being opened.

(d) Monomer recovery system. The concentration of vinyl chloride in all exhaust gases discharged to the atmosphere from each monomer recovery system is not to exceed 10 ppm, except as provided in § 61.65(a). This requirement does not apply to equipment that has been opened, is out of operation, and met the requirement in § 61.65(b)(6)(i) before being opened.

(e) Sources following the stripper(s): The following requirements apply to emissions of vinyl chloride to the atmosphere from the combination of all sources following the stripper(s) [or the reactor(s) if the plant has no stripper(s)] in the plant process flow including but not limited to, centrifuges, concentrators, blend tanks, filters, dryers, conveyor air discharges, baggers, storage containers, and inprocess wastewater:

(1) In polyvinyl chloride plants using stripping technology to control vinyl chloride emissions, the weighted average residual vinyl chloride concentration in all grades of polyvinyl chloride resin processed through the stripping operation on each calendar day, measured immediately after the stripping operation is completed, may not exceed:

(i) 2000 ppm for polyvinyl chloride dispersion resins, excluding latex resins;

(ii) 400 ppm for all other polyvinyl chloride resins, including latex resins, averaged separately for each type of resin; or

(2) In polyvinyl chloride plants controlling vinyl chloride emissions with technology other than stripping or in addition to stripping, emissions of vinyl chloride to the atmosphere may not exceed:

(i) 2 g/kg (0.002 lb/lb) product from the stripper(s) [or reactor(s) if the plant has no stripper(s)] for dispersion polyvinyl chloride resins, excluding latex resins, with the product determined on a dry solids basis;

(ii) 0.4 g/kg (0.0004 lb/lb) product from the strippers [or reactor(s) if the plant has no stripper(s)] for all other polyvinyl chloride resins, including latex resins, with the product determined on a dry solids basis.

§ 61.63 Emission standard for ethylene dichloride, vinyl chloride and polyvinyl chloride plants.

An owner or operator of an ethylene dichloride, vinyl chloride, and/or polyvinyl chloride plant shall comply with the requirements of this section.

(a) Relief valve discharge: Except for an emergency relief discharge, there is to be no discharge to the atmosphere from any relief valve on any equipment in vinyl chloride service. An emergency relief discharge means a discharge which could not have been avoided by taking measures to prevent the discharge. Within 10 days of any relief valve discharge, the owner or operator of the source from which the relief valve discharge occurs shall submit to the Administrator a report in writing containing information on the source, nature and cause of the discharge, the date and time of the discharge, the approximate total vinyl chloride loss during the discharge, the method used for determining the vinyl chloride loss, the action that was taken to prevent the discharge, and measures adopted to prevent future discharges.

(b) Fugitive emission sources:

(1) Loading and unloading lines: Vinyl chloride emissions from loading and unloading lines which are opened to the atmosphere after each loading or unloading operation are to be minimized as follows:

(i) After each loading or unloading operation and before opening a loading or unloading line to the atmosphere, the quantity of vinyl chloride in all parts of each loading or unloading line that are to be opened to the atmosphere is to be reduced so that the parts combined contain no greater than 0.0038 m^3 (0.13 ft^3) of vinyl chloride, at standard temperature and pressure; and

(ii) Any vinyl chloride removed from a loading or unloading line in accordance with paragraph (b)(1)(i) of this section is to be ducted through a control system from which the concentration of vinyl chloride in the exhaust gases does not exceed 10 ppm, or equivalent as provided in § 61.66.

(2) Slip gauges: During loading or unloading operations, the vinyl chloride emissions from each slip gauge in vinyl chloride service are to be minimized by ducting any vinyl chloride discharged from the slip gauge through a control system from which the concentration of vinyl chloride in the exhaust gases does not exceed 10 ppm, or equivalent as provided in § 61.66.

(3) Leakage from pump, compressor, and agitator seals:

(i) Rotating pumps: Vinyl chloride emissions from seals on all rotating pumps in vinyl chloride service are to be minimized by installing sealless pumps, pumps with double mechanical seals, or equivalent as provided in § 61.66. If double mechanical seals are used, vinyl chloride emission from the seals are to be minimised by maintaining the pressure between the two seals so that any leak that occurs is into the pump; by ducting any vinyl chloride between the two seals through a control system from which the concentration of vinyl chloride in the exhaust gases does not exceed 10 ppm; or equivalent as provided in § 61.66.

(ii) Reciprocating pumps: Vinyl chloride emissions from seals on all reciprocating pumps in vinyl chloride service are to be minimized by installing double outboard seals, or equivalent as provided in § 61.66. If double outboard seals are used, vinyl chloride emissions from the seals are to be minimized by maintaining the pressure between the two seals so that any leak that occurs is into the pump; by ducting any vinyl chloride between the two seals through a control system from which the concentration of vinyl chloride in the exhaust gases does not exceed 10 ppm; or equivalent as provided in § 61.66.

(iii) Rotating compressor: Vinyl chloride emissions from seals on all rotating compressors in vinyl chloride service are to be minimized by installing compressors with double mechanical seals, or equivalent as provided in § 61.66. If double mechanical seals are used, vinyl chloride emissions from the seals are to be minimized by maintaining the pressure between the two seals so that any leak that occurs is into the compressor; by ducting any vinyl chloride between the two seals through a control system from which the concentration of vinyl chloride in the exhaust gases does not exceed 10 ppm; or equivalent as provided in § 61.66.

(iv) Reciprocating compressors: Vinyl chloride emissions from seals on all reciprocating compressors in vinyl chloride service are to be minimized by installing double outboard seals, or equivalent as provided in § 61.66. If double outboard seals are used, vinyl chloride emissions from the seals are to be minimized by maintaining the pressure between the two seals so that any leak that occurs is into the compressor; by ducting any vinyl chloride between the two seals through a control system from which the concentration of vinyl chloride in the exhaust gases does not exceed 10 ppm; or equivalent as provided in § 61.66.

(v) Agitator: Vinyl chloride emissions from seals on all agitators in vinyl chloride service are to be minimized by installing agitators with double mechanical seals, or equivalent as provided in § 61.66. If double mechanical seals are used, vinyl chloride emissions from the seals are to be minimized by maintaining the pressure between the two seals so that any leak that occurs is into the agitated vessel; by ducting any vinyl chloride between the two seals through a control system from which the concentration of vinyl chloride in the exhaust gases does not exceed 10 ppm; or equivalent as provided in § 61.66.

(4) Leakage from relief valves: Vinyl chloride emissions due to leakage from each relief valve on equipment in vinyl chloride service are to be minimized by installing a rupture disk between the equipment and the relief valve, by connecting the relief valve discharge to a process line or recovery system, or equivalent as provided in § 61.66.

(5) Manual venting of gases: Except as provided in § 61.64(a)(3), all gases which are manually vented from equipment in vinyl chloride service are to be ducted through a control system from which the concentration of vinyl chloride in the exhaust gases does not exceed 10 ppm; or equivalent as provided in § 61.66.

(6) Opening of equipment: Vinyl chloride emissions from opening of equipment (including loading or unloading lines that are not opened to the atmosphere after each loading or unloading operation) are to be minimized as follows:

(i) Before opening any equipment for any reason, the quantity of vinyl chloride is to be reduced so that the equipment contains no more than 2.0 percent by volume vinyl chloride or 0.0950 m^3 (25 gal) of vinyl chloride, whichever is larger, at standard temperature and pressure; and

(ii) Any vinyl chloride removed from the equipment in accordance with paragraph (b)(6)(i) of this section is to be ducted through a control system from which the concentration of vinyl chloride in the exhaust gases does not exceed 10 ppm, or equivalent as provided in § 61.66.

(7) Samples: Unused portions of samples containing at least 10 percent by weight vinyl chloride are to be returned to the process, and sampling techniques are to be such that sample containers in vinyl chloride service are purged into a closed process system.

(8) Leak detection and elimination: Vinyl chloride emissions due to leaks from equipment in vinyl chloride service are to be minimized by instituting and implementing a formal leak detection and elimination program. The owner or operator shall submit a description of the program to the Administrator for approval. The program is to be submitted within 45 days of the effective date of these regulations, unless a waiver of compliance is granted under § 61.11. If a waiver of compliance is granted, the program is to be submitted on a date scheduled by the Administrator. Approval of a program will be granted by the Administrator provided he finds:

(i) It includes a reliable and accurate vinyl chloride monitoring system for detection of major leaks and identification of the general area of the plant where a leak is located. A vinyl chloride monitoring system means a device which obtains air samples from one or more points on a continuous sequential basis and analyzes the samples with gas chromatography or, if the owner or operator assumes that all hydrocarbons measured are vinyl chloride, with infrared spectrophotometry flame ion detection, or an equivalent or alternative method.

(ii) It includes a reliable and accurate portable hydrocarbon detector to be used routinely to find small leaks and to pinpoint the major leaks indicated by the vinyl chloride monitoring system. A portable hydrocarbon detector means a device which measures hydrocarbons with a sensitivity of at least 10 ppm and is of such design and size that it can be used to measure emissions from localized points.

(iii) It provides for an acceptable calibration and maintenance schedule for the vinyl chloride monitoring system and portable hydrocarbon detector. For the vinyl chloride monitoring system, a daily span check is to be conducted with a concentration of vinyl chloride equal to the concentration defined as a leak according to paragraph (b)(8)(vi) of this section. The calibration is to be done with either:

(A) A calibration gas mixture prepared from the gases specified in sections 5.2.1 and 5.2.3 of Test Method 106, or

(B) A calibration gas cylinder containing the appropriate concentration of vinyl chloride. If a calibration gas cylinder is used, the analysis must be traceable to the National Bureau of Standards or to a gravimetrically calibrated vinyl chloride permeation tube.

(iv) The location and number of points to be monitored and the frequency of monitoring provided for in the program are acceptable when they are compared with the number of pieces of equipment in vinyl chloride service and the size and physical layout of the plant.

(v) It contains an acceptable plan of action to be taken when a leak is detected

(vi) It contains a definition of leak which is acceptable when compared with the background concentrations of vinyl chloride in the areas of the plant to be monitored by the vinyl chloride monitoring system. Measurements of background concentrations of vinyl chloride in the areas of the plant to be monitored by the vinyl chloride monitoring system are to be included with the description of the program. The definition of leak for a given plant may vary among the different areas within the plant and is also to change over time as background concentrations in the plant are reduced.

(9) Inprocess wastewater: Vinyl chloride emissions to the atmosphere from inprocess wastewater are to be reduced as follows:

(i) The concentration of vinyl chloride in each inprocess wastewater stream containing greater than 10 ppm vinyl chloride measured immediately as it leaves a piece of equipment and before being mixed with any other inprocess wastewater stream is to be reduced to no more than 10 ppm by weight before being mixed with any other inprocess wastewater stream which contains less than 10 ppm vinyl chloride; before being exposed to the atmosphere, before being discharged to a wastewater treatment process; or before being discharged untreated as a wastewater. This paragraph does apply to water which is used to displace vinyl chloride from equipment before it is opened to the atmosphere in accordance with § 61.64(a)(2) or paragraph (b)(6) of this section, but does not apply to water which is used to wash out equipment after the equipment has already been opened to the atmosphere in accordance with § 61.64(a)(2) or paragraph (b)(6) of this section.[30]

(ii) Any vinyl chloride removed from the inprocess wastewater in accordance with paragraph (b)(9)(i) of this section is to be ducted through a control system from which the concentration of vinyl chloride in the exhaust gases does not exceed 10 ppm, or equivalent as provided in § 61.66.

(c) The requirements in paragraphs (b)(1), (b)(2), (b)(5), (b)(6), (b)(7) and (b)(8) of this section are to be incorporated into a standard operating procedure, anr made available upon request for inspection by the Administrator. The standard operating procedure is to include provisions for measuring the vinyl chloride in equipment ≥4.75 m^3 (1,250 gal) in volume for which an emission limit is prescribed in § 61.65(b)(6)(i) prior to opening the equipment and using Test Method 106, a portable hydrocarbon detector, or an equivalent or alternative method. The method of measurement is to meet the requirements in § 61.67(g)(5)(i)(A) or (g)((5)(i)(B).[30]

§ 61.66 Equivalent equipment and procedures.

Upon written application from an owner or operator, the Administrator may approve use of equipment or procedures which have been demonstrated to his satisfaction to be equivalent in terms of reducing vinyl chloride emissions to the atmosphere to those prescribed for compliance with a specific paragraph of this subpart. For an existing source, any request for using an equivalent method as the initial measure of control is to be submitted to the Administrator within 30 days of the effective date. For a new source, any request for using an equivalent method is to be submitted to the Administrator with the application for approval of construction or modification required by § 61.07.

§ 61.67 Emission tests.

(a) Unless a waiver of emission testing is obtained under § 61.13, the owner or operator of a source to which this subpart applies shall test emissions from the source.

(1) Within 90 days of the effective date in the case of an existing source or a new source which has an initial startup date preceding the effective date, or

(2) Within 90 days of startup in the case of a new source, initial startup of which occurs after the effective date.

(b) The owner or operator shall provide the Administrator at least 30 days prior notice of an emission test to afford the Administrator the opportunity to have an observer present during the test.

(c) Any emission test is to be conducted while the equipment being tested is operating at the maximum production rate at which the equipment will be operated and under other relevant conditions as may be specified by the Administrator based on representative performance of the source.

(d) Each emission test is to consist of three runs. For the purpose of determining emissions, the average of results of all runs is to apply. The average is to be computed on a time weighted basis.

(e) All samples are to be analyzed within 24 hours, and vinyl chloride emissions are to be determined within 30 days after the emission test. The owner or operator shall report the determinations to the Administrator by a registered letter dispatched before the close of the next business day following the determination.

(f) The owner or operator shall retain at the plant and make available, upon request, for inspection by the Administrator, for a minimum of 2 years records of emission test results and other data needed to determine emissions.

(g) Unless otherwise specified, the owner or operator shall use test Test Methods in Appendix B to this part for each test as required by paragraphs (g)(1), (g)(2), (g)(3), (g)(4), and (g)(5) of this section, unless an equivalent method or an alternative method has been approved by the Administrator. If the Administrator finds reasonable grounds to dispute the results obtained by an equivalent or alternative method, he may require the use of a reference method. If the results of the reference and equivalent or alternative methods do not agree, the results obtained by the reference method prevail, and the Administrator may notify the owner or operator that approval of the method previously considered to be equivalent or alternative is withdrawn.

(1) Test Method 106 is to be used to determine the vinyl chloride emissions from any source for which an emission limit is prescribed in §§ 61.62(a) or (b) § 61.63(a), or §§ 61.64(a)(1), (b), (c), or (d), or from any control system to which reactor emissions are required to be ducted in § 61.64(a)(2) or to which fugitive emissions are required to be ducted in §§ 61.65(b)(1)(ii), (b)(2), (b)(5), (b)(6)(ii), or (b)(9)(ii).

(i) For each run, one sample is to be collected. The sampling site is to be at least two stack or duct diameters downstream and one half diameter upstream from any flow disturbance such as a bend, expansion, contraction, or visible flame. For a rectangular cross section an equivalent diameter is to be determined from the following equation:

$$\text{equivalent diameter} = 2\,\frac{(\text{length})\ (\text{width})}{\text{length} + \text{width}}$$

The sampling point in the duct is to be at the centroid of the cross section. The sample is to be extracted at a rate proportional to the gas velocity at the sampling point. The sample is to be taken over a minimum of one hour, and is to contain a minimum volume of 50 liters corrected to standard conditions.

(ii) For gas streams containing more than 10 percent oxygen, the concentration of vinyle chloride as determined by Test Method 106 is to be corrected to 10 percent oxygen for determination of emissions by using the following equation:

$$C_{b\,(\text{corrected})} = C_b\,\frac{10.9}{20.9 - \text{percent } O_2}$$

where:

$C_{b(\text{corrected})}$ = The concentration of vinyl chloride in the exhaust gases, corrected to 10 percent oxygen.
C_b = The concentration of vinyl chloride as measured by Test Method 106.
20.9 = Percent oxygen in the ambient air at standard conditions.
10.9 = Percent oxygen in the ambient air at standard conditions, minus the 10 percent oxygen to which the correction is being made.
Percent O_2 = Percent oxygen in the exhaust gas as measured by Reference Method 3 in Appendix A of Part 60 of this chapter.

(iii) For those emission sources where the emission limit is prescribed in terms of mass rather than concentration, mass emissions in kg/100 kg product are to be determined by using the following equation:

$$C_{BX} = \frac{[C_b\ (2.60)\ Q\ 10^{-6}]\ [100]}{Z}$$

where:

C_{BX} = kg vinyl chloride/100 kg product.
C_b = The concentration of vinyl chloride as measured by Test Method 106.
2.60 = Density of vinyl chloride at one atmosphere and 20°C in kg/m³.
Q = Volumetric flow rate in m³/hr as determined by Reference Method 2 of Appendix A to Part 60 of this chapter.
10^{-6} = Conversion factor for ppm.
Z = Production rate (kg/hr).

(2) Test Method 107 is to be used to determine the concentration of vinyl chloride in each inprocess wastewater stream for which an emission limit is prescribed in § 61.65(b)(9)(i).

(3) Where a stripping operation is used to attain the emission limit in § 61.64(e), emissions are to be determined using Test Method 107 as follows:

(i) The number of strippers and samples and the types and grades of resin to be sampled are to be determined by the Administrator for each individual plant at the time of the test based on the plant's operation.

(ii) Each sample is to be taken immediately following the stripping operation.

(iii) The corresponding quantity of material processed by each stripper is to be determined on a dry solids basis and by a method submitted to and approved by the Administrator.

(iv) At the prior request of the Administrator, the owner or operator shall provide duplicates of the samples required in paragraph (g)(3)(i) of this section.

(4) Where control technology other than or in addition to a stripping operation is used to attain the emission limit in § 61.64(e), emissions are to be determined as follows:

(i) Test Method 106 is to be used to determine atmospheric emissions from all of the process equipment simultaneously. The requirements of paragraph (g)(1) of this section are to be met.

(ii) Test Method 107 is to be used to determine the concentration of vinyl chloride in each inprocess wastewater stream subject to the emission limit prescribed in § 61.64(e). The mass of vinyl chloride in kg/100 kg product in each in process wastewater stream is to be determined by using the following equation:

$$C_{BX} = \frac{[C_d\ R\ 10^{-6}]\ [100]}{Z}$$

where:

C_{BX} = kg vinyl chloride/100 kg product.
C_d = the concentration of vinyl chloride as measured by Test Method 107.
R = water flow rate in l/hr, determined in accordance with a method which has been submitted to and approved by the Administrator.
10^{-6} = Conversion factor for ppm.
Z = Production rate (kg/hr), determined in accordance with a method which has been submitted and approved by the Administrator.

(5) The reactor opening loss for which an emission limit is prescribed in § 61.64(a)(2) is to be determined. The number of reactors for which the determination is to be made is to be specified by the Administrator for each individual plant at the time of the determination based on the plant's operation. For a reactor that is also used as a stripper, the determination may be made immediately following the stripping operation.

(i) Except as provided in paragraph (g)(5)(ii) of this section, the reactor opening loss is to be determined using the following equation:

$$C = \frac{W\ (2.60)\ (10^{-6})\ (Cb)}{YZ}$$

where:

C = kg vinyl chloride emissions/kg product.
W = Capacity of the reactor in m³.
2.60 = Density of vinyl chloride at one atmosphere and 20° C in kg/m³.
10^{-6} = Conversion factor for ppm.
Cb = ppm by volume vinyl chloride as determined by Test Method 106 or a portable hydrocarbon detector which measures hydrocarbons with a sensitivity of at least 10 ppm.
Y = Number of batches since the reactor was last opened to the atmosphere.
Z = Average kg of polyvinyl chloride produced per batch in the number of batches since the reactor was last opened to the atmosphere.

(A) If Method 106 is used to determine the concentration of vinyl chloride (Cb), the sample is to be withdrawn at a constant rate with a probe of sufficient length to reach the vessel bottom from the manhole. Samples are to be taken for 5 minutes within 6 inches of the vessel bottom, 5 minutes near the vessel center, and 5 minutes near the vessel top.

(B) If a portable hydrocarbon detector is used to determine the concentration of vinyl chloride (Cb), a probe of sufficient length to reach the vessel bottom from the manhole is to be used to make the measurements. One measurement will be made within 6 inches of the vessel bottom, one near the vessel center and one near the vessel top. Measurements are to be made at each location until the reading is stabilized. All hydrocarbons measured are to be assumed to be vinyl chloride.

(C) The production rate of polyvinyl chloride (Z) is to be determined by a method submitted to and approved by the Administrator.

(ii) A calculation based on the number of evacuations, the vacuum involved, and the volume of gas in the reactor is hereby approved by the Administrator as an alternative method for determining reactor opening loss for postpolymerization reactors in the manufacture of bulk resins.

§ 61.68 Emission monitoring.

(a) A vinyle chloride monitoring system is to be used to monitor on a continuous basis the emissions from the sources for which emission limits are prescribed in § 61.62(a) and (b), § 61.63(a), and § 61.64(a)(1), (b), (c), and (d), and for any control system to which reactor emissions are required to be ducted in § 61.64(a)(2) or to which fugitive emissions are required to be ducted in 30 § 61.65(b)(1)(ii), and (b)(2), (b)(5), (b)(6)(ii), and (b)(9)(ii).

(b) The vinyl chloride monitoring system(s) used to meet the requirement in paragraph (a) of this section is to be a device which obtains air sampels from one or more points on a continuous sequential basis and analyzes the samples with gas chromotography or, if the owner or operator assumes that all hydrocarbons measured are vinyl chloride, with infrared spectrophotometry, flame ion detection, or an equivalent or alternative method. The vinyl chloride monitoring system used to meet the requirements in § 61.65(b)(8)(i) may be used to meet the requirements of this section.

(c) A daily span check is to be conducted for each vinyle chloride monitoring system used. For all of the emission sources listed in paragraph (a) of this section, except the one for which an emission limit is prescribed in § 61.62(b), the daily span check is to be conducted with a concentration of vinyl chloride equal to 10 ppm. For the emission source for which an emission limit is prescribed in § 61.62(b), the daily span check is to be conducted with a concentration of vinyl chloride which is determined to be equivalent to the emission limit for that source based on the emission test required by § 67.67. The calibration is to be done with either: [30]

(1) A calibration gas mixture prepared from the gases specified in sections 5.2.1 and 5.2.3 of Test Method 106, or

(2) A calibration gas cylinder containing the appropriate concentration of vinyl chloride. If a calibration gas cylinder is used, the analysis must be traceable to the National Bureau of Standards or to a gravimetrically calibrated vinyl chloride permeation tube.

§ 61.69 Initial report.

(a) An owner or operator of any source to which this subpart applies shall submit a statement in writing notifying the Administrator that the equipment and procedural specifications in §§ 61.65 (b)(1), (b)(2), (b)(3), (b)(4), (b)(5), (b)(6), (b)(7), and (b)(8) are being implemented.

(b)(1) In the case of an existing source or a new source which has an initial startup date preceding the effective date, the statement is to be submitted within 90 days of the effective date, unless a waiver of compliance is granted under § 61.11, along with the information required under § 61.10. If a waiver of compliance is granted, the statement is to be submitted on a date scheduled by the Administrator.

(2) In the case of a new source which did not have an initial startup date preceding the effective date, the statement is to be submitted within 90 days of the initial startup date.

(c) The statement is to contain the following information:

(1) A list of the equipment installed for compliance,

(2) A description of the physical and functional characteristics of each piece of equipment.

(3) A description of the methods which have been incorporated into the standard operating procedures for measuring or calculating the emissions for which emission limits are prescribed in §§ 61.65 (b)(1)(i) and (b)(6)(i),

(4) A statement that each piece of equipment is installed and that each piece of equipment and each procedure is being used.

§ 61.70 Semiannual report.

(a) The owner or operator of any

(a)(2) is to be determined. The number

source to which this subpart applies shall submit to the Administrator on September 15 and March 15 of each year a report in writing containing the information required by this section. The first semiannual report is to be submitted following the first full 6 month reporting period after the initial report is submitted.

(b)(1) In the case of an existing source or a new source which has an initial startup date preceding the effective date, the first report is to be submitted within 180 days of the effective date, unless a waiver of compliance is granted under § 61.11. If a waiver of compliance is granted, the first report is to be submitted on a date scheduled by the Administrator.

(2) In the case of a new source which did not have an initial startup date preceding the effective date, the first report is to be submitted within 180 days of the initial startup date.

(c) Unless otherwise specified, the owner or operator shall use the Test Methods in Appendix B to this part to conduct emission tests as required by paragraphs (c)(2) and (c)(3) of this section, unless an equivalent or an alternative method has been approved by the Administrator. If the Administrator finds reasonable grounds to dispute the results obtained by an equivalent or alternative method, he may require the use of a reference method. If the results of the reference and equivalent or alternative methods do not agree, the results obtained by the reference method prevail, and the Administrator may notify the owner or operator that approval of the method previously considered to be equivalent or alternative is withdrawn.

(1) The owner or operator shall include in the report a record of any emissions which averaged over any hour period (commencing on the hour) are in excess of the emission limits prescribed in §§ 61.62(a) or (b), § 61.63(a), or §§ 61.64(a)(1), (b), (c), or (d), or for any control system to which reactor emissions are required to be ducted in § 61.64(a)(2) or to which fugitive emissions are required to be ducted in § 61.65 (b)(1)(ii), (b)(2), (b)(5), (b)(6)(ii), or (b)(9)(ii). The emissions are to be measured in accordance with § 61.68.

(2) In polyvinyl chloride plants for which a stripping operation is used to attain the emisison level prescribed in § 61.64(e), the owner or operator shall include in the report a record of the vinyl chloride content in the polyvinyl chloride resin. Test Method 107 is to be used to determine vinyl chloride content as follows:

(i) If batch stripping is used, one representative sample of polyvinyl chloride resin is to be taken from each batch of each grade of resin immediately following the completion of the stripping. and grade and the date and time the batch is completed. The corresponding quantity of material processed in each stripper batch is to be recorded and identified by resin type and grade and the date and time the batch is completed.

(ii) If continuous stripping is used, one representative sample of polyvinyl chloride resin is to be taken for each grade of resin processed or at intervals of 8 hours for each grade of resin which is being processed, whichever is more frequent. The sample is to be taken as the resin flows out of the stripper and identified by resin type and grade and the date and time the sample was taken. The corresponding quantity of material processed by each stripper over the time period represented by the sample during the eight hour period, is to be recorded and identified by resin type and grade and the date and time it represents.

(iii) The quantity of material processed by the stripper is to be determined on a dry solids basis and by a method submitted to and approved by the Administrator.

(iv) At the prior request of the Administrator, the owner or operator shall provide duplicates of the samples required in paragraphs (c)(2)(i) and (c)(2)(ii) of this section.

(v) The report to the Administrator by the owner or operator is to include the vinyl chloride content found in all the samples required in paragraphs (c)(2)(i) and (c)(2)(ii) of this section, averaged separately for each type of resin, over each calendar day and weighted according to the quantity of each grade of resin processed by the stripper(s) that calendar day, according to the following equation:

$$A_{T_j}=\frac{\sum_{i=1}^{n} P_{G_i} M_{G_i}}{Q_{T_j}}$$

$$=\frac{P_{G_1} M_{G_1}+P_{G_2} M_{G_2}+\ldots+P_{G_n} M_{G_n}}{Q_{T_j}}$$

A=24-hour average concentration of type T_j resin in ppm.
Q=Total production of type T_j resin over the 24-hour period, in kg.
T_j=Type of resin; j=1,2, . . . m where m is total number of resin types produced during the 24-hour period.
M=Concentration of vinyl chloride in one sample of grade G_i resin, in ppm.
P=Production of grade G_i resin represented by the sample, in kg.
G_i=Grade of resin, e.g., G_1, G_2, and G_3.
n=Total number of grades of resin produced during the 24-hour period.

(vi) The owner or operator shall retain at the source and make available for inspection by the Administrator for a minimum of 2 years records of all data needed to furnish the information required by paragraph (c)(2)(v) of this section: The records are to contain the following information:

(A) The vinyl chloride content found in all the samples required in paragraphs (c)(2)(i) and (c)(2)(ii) of this section, identified by the resin type and grade and the time and date of the sample, and

(B) The corresponding quantity of polyvinyl chloride resin processed by the stripper(s), identified by the resin type and grade and the time and date it represents.

(3) The owner or operator shall include in the report a record of the emissions from each reactor opening for which an emission limit is prescribed in § 61.64(a)(2). Emissions are to be determined in accordance with § 61.67(g)(5), except that emissions for each reactor are to be determined. For a reactor that is also used as a stripper, the determination

may be made immediately following the stripping operation.

§ 61.71 Recordkeeping.

(a) The owner or operator of any source to which this subpart applies shall retain the following information at the source and make it available for inspection by the Administrator for a minimum of two years;

(1) A record of the leaks detected by the vinyl chloride monitoring system, as required by § 61.65(b)(8), including the concentrations of vinyl chloride as measured, analyzed, and recorded by the vinyl chloride detector, the location of each measurement and the date and approximate time of each measurement.

(2) A record of the leaks detected during routine monitoring with the portable hydrocarbon detector and the action taken to repair the leaks, as required by § 61.65(b)(8), including a brief statement explaining the location and cause of each leak detected with the portable hydrocarbon detector, the date and time of the leak and any action taken to eliminate that leak measured in accordance with § 61.68.

(3) For the relief discharges from reactors subject to the provisions of § 61.65(a), a daily operating record for each reactor, including pressures and temperatures.

APPENDIX A

National Emission Standards for Hazardous Air Pollutants

Compliance Status Information

I. SOURCE REPORT

INSTRUCTIONS: Owners or operators of sources of hazardous pollutants subject to the National Emission Standards for Hazardous Air Pollutants are required to submit the information contained in Section I to the appropriate U.S. Environmental Protection Agency Regional Office prior to 90 days after the effective date of any standards or amendments which require the submission of such information.

A list of regional offices is provided in §61.04. ____________________

A. SOURCE INFORMATION

1. Identification/Location - Indicate the name and address of each source.

1 2 Region — 3 4 State — 5 8 County — 9 13 Source Number — 14 0 0 0 16 — 17 0 0 18 — 1 19

20 22 AQCR # — 23 26 City Code — 27 Source Name 46

47 Street Address (Location of Plant) 66 — 80

Dup 1-18 — 19 — 20 City Name 34 — State 35 39

40 State Regis. Number 64 — 65 68 NEDS X Ref.

69 SIC 62 — FF 64 — 8 A/P 65 — 77 79 Staff — 80

Dup 1-18 — 5 19 — CS 30 — STP 31 — EC 49 — 80

2. Contact - Indicate the name and telephone number of the owner or operator or other responsible official whom EPA may contact concerning this report.

Dup 1-18 — 4 1 19 20 — 21 Name 43

44 46 Area Code — 47 - Number 54 — 80

3. Source Description - Briefly state the nature of the source (e.g., "Chlor-alkali Plant" or "Machine Shop").

Dup 1-18 — 4 2 19 20 — 21 Description 80

21 Continued 79 — 80

4. Alternative Mailing Address - Indicate an alternative mailing address if correspondence is to be directed to a location different than that specified above.

Dup 1-18 — 4 3 19 20 — 21 Number Street or Box Number 45 — 80

Dup 1-18 — 4 4 19 20 — 21 City 35 — 37 38 State — 41 Zip 44 — 80

5. Compliance Status - The emissions from this source ___ can ___ cannot meet the emission limitations contained in the National Emission Standards on or prior to 90 days after the effective date of any standards or amendments which require the submission of such information.

____
Signature of Owner, Operator or Other Responsible Official

NOTE: If the emissions from the source will exceed those limits set by the National Emission Standards for Hazardous Air Pollutants, the source will be in violation and subject to Federal enforcement actions unless granted a waiver of compliance by the Administrator of the U.S. Environmental Protection Agency. The information needed for such waivers is listed in Section II of this form.

B. PROCESS INFORMATION. Part B should be completed separately for each point of emission for each hazardous pollutant. [Sources subject to 61.22(1) may omit number 4. below.]

Dup 1-13 14 16 0 0 17 18 5 19 20 SCC 27 28 29 NEDS X Ref 30 LS 31 SIP

1. Pollutant Emitted - Indicate the type of hazardous pollutant emitted by the process. Indicate "AB" for asbestos, "BE" for beryllium, or "HG" for mercury.

32 33 Pollutant | 34 Regulation 48 | 49 EC

2. Process Description - Provide a brief description of each process (e.g., "hydrogen end box" in a mercury chlor-alkali plant, "grinding machine" in a beryllium machine shop). Use additional sheets if necessary.

50 Process Description 74 | 80

Dup 1-18 6 1 19 20 21 50

51 79 80

Dup 1-18 6 2 19 20 21 50

51 79 80

3. Amount of Pollutant - Indicate the average weight of the hazardous material named in Item 1 which enters the process in pounds per month (based on the previous twelve months of operation).

Dup 1-18 6 3 19 20 | 21 27 | lbs./mo. 29 36 80

4. Control Devices

a. Indicate the type of pollution control devices, if any, used to reduce the emissions from the process (e.g., venturi scrubber, baghouse, wet cyclone) and the estimated percent of the pollutant which the device removes from the process gas stream.

Dup 1-18 6 4 19 20 PRIMARY CONTROL DEVICE: 21 43

45 Primary Device Name 64 66 70 Percent Removal Efficiency | 72 79

80

Dup 1-18 6 5 19 20 SECONDARY CONTROL DEVICES: 21 45

47 Secondary Device Name 64 66 70 Percent Removal Efficiency | % EFFIC. 72 79 80

b. **Asbestos Emission Control Devices Only**

i. If a baghouse is specified in Item 4a, give the following information:

- The air flow permeability in cubic feet per minute per square foot of fabric area.

  Air flow permeability = __________ cfm/ft^2

- The pressure drop in inches water gauge across the filter at which the baghouse is operated.

  Operating pressure drop = __________ inches w.g.

- If the baghouse material contains synthetic fill yarn, check whether this material is ☐ spun ☐ or not spun.

- If the baghouse utilizes a felted fabric, give the minimum thickness in inches and the density in ounces per square yard.

  Thickness = ________ inches Density = ________ oz/yd^2

ii. If a wet collection device is specified in Item 4a, give the designed unit contacting energy in inches water gauge.

- Unit contacting energy = ________ inches w.g.

C. DISPOSAL OF ASBESTOS-CONTAINING WASTES. Part C should be completed separately for each asbestos-containing waste generation operation arising from sources subject to §61.22(a), (c), (e), and (h).

Dup 1-13 ‾14‾‾16‾ 17 ‾00‾ 18 ‾5‾ 19 20 ‾SCC‾ 27 28 29 NEDS X Ref 30 CS 31 SIP

32 ‾AB‾ 33 Pollutant 34 ‾Regulation‾ 48 49 EC

1. Waste Generation - Provide a brief description of each process that generates asbestos-containing waste (e.g. disposal of control device wastes).

50 ‾Process Description‾ 79 80

2. Asbestos Concentration - Indicate the average percentage asbestos content of these materials.

Dup 1-18 19 ‾6 1‾ 20 21 ‾ASBESTOS CONCENTRATION:‾ 43 45 ‾‾ 48

50 ‾%‾ 80

3. Amount of Wastes - Indicate the average weight of asbestos-containing wastes disposed of, measured in kg/day.

Dup 1-18 19 ‾6 2‾ 20 21 ‾‾ 27 29 ‾kg/day‾ 34 80

4. Control Methods - Indicate the emission control methods used in all stages of waste disposal, from collection, processing, and packaging to transporting and deposition.

Dup 1-18 19 ‾6 3‾ 20 21 ‾Primary Control Method‾ 43

45 ‾‾ 79 80

Dup 1-18 19 ‾6 4‾ 20 21 ‾‾ 50

51 ‾‾ 79 80

5. Waste Disposal - Indicate the type of disposal site (sanitary landfill, open, covered) or incineration site (municipal, private) where the waste is disposed of and who operates the site (company, private, municipal). State the name and location of the site (closest city or town, county, state).

Dup 1-18 19 ‾6 5‾ 20 21 ‾TYPE OF SITE:‾ 33 35 ‾‾ 50

51 ‾‾ 79 80

Dup 1-18 19 ‾6 6‾ 20 21 ‾OPERATOR:‾ 29 31 ‾‾ 50

51 ‾‾ 79 80

Dup 1-18 19 ‾6 7‾ 20 21 ‾LOCATION:‾ 29

31 ‾‾ 70

71 ‾‾ 79 80

D. WASTE DISPOSAL SITES. Part D should be completed separately for each asbestos waste disposal site subject to section 61.22(l).

Dup 1-13 14 16 17 0 0 18 19 5 20 SCC 27 28 29 NEDS X Ref 30 CS 31 SIP

32 A B 33 Pollutant 34 Regulation 48 49 EC

50 WASTE DISPOSAL SITE 68 80

1. Description - Provide a brief description of the site, including its size and configuration, and the distance to the closest city or town, closest residence, and closest primary road.

Dup 1-18 19 6 1 20 21 SITE DESCRIPTION 37 39 50

51 79 80

Dup 1-18 19 6 2 20 21 DISTANCE: 29 30 TOWN: 34 36 40 42 K M 43

45 RESIDENCE: 54 56 60 62 K M 63 65 ROAD: 69 71 75

77 K M 78 80

2. Inactivation - After the site is inactivated, indicate the method or methods used to comply with the standard and send a list of the actions that will be undertaken to maintain the inactivated site.

Dup 1-18 19 6 8 20 21 COMPLIANCE METHOD/INACTIVE SITE: 52

54 79 80

II. WAIVER REQUESTS

A. WAIVER OF COMPLIANCE. Owners or operators of sources unable to operate in compliance with the National Emission Standards for Hazardous Air Pollutants prior to 90 days after the effective date of any standards or amendments which require the submission of such information may request a waiver of compliance from the Administrator of the U.S. Environmental Protection Agency for the time period necessary to install appropriate control devices or make modifications to achieve compliance. The Administrator may grant a waiver of compliance with the standard for a period not exceeding two years from the effective date of the hazardous pollutant standards, if he finds that such period is necessary for the installation of controls and that steps will be taken during the period of the waiver to assure that the health of persons will be protected from imminent endangerment.

The report information provided in Section I must accompany this application. Applications should be sent to the appropriate EPA regional office.

1. Processes Involved - Indicate the process or processes emitting hazardous pollutants to which emission controls are to be applied.

2. Controls

   a. Describe the proposed type of control device to be added or modification to be made to the process to reduce the emissions of hazardous pollutants to an acceptable level. (Use additional sheets if necessary.)

   b. Describe the measures that will be taken during the waiver period to assure that the health of persons will be protected from imminent endangerment. (Use additional sheets if necessary.)

3. Increments of Progress - Specify the dates by which the following increments of progress will be met.

   - Date by which contracts for emission control systems or process modifications will be awarded; or date by which orders will be issued for the purchase of the component parts to accomplish emission control or process modification.

Dup 1-16 0 1 7
17 19 53 54 55 60 61 MO/DY/YR 66 80

   - Date of initiation of on-site construction or installation of emission control equipment or process change.

Dup 1-16 0 2 7
17 19 53 54 55 60 61 MO/DY/YR 66 80

   - Date by which on-site construction or installation of emission control equipment or process modification is to be completed.

Dup 1-16 0 3 7
17 19 53 54 55 60 61 MO/DY/YR 66 80

   - Date by which final compliance is to be achieved.

Dup 1-16 0 4 7
17 19 53 54 55 60 61 MO/DY/YR 66 80

B. WAIVER OF EMISSION TESTS. A waiver of emission testing may be granted to owners or operators of sources of beryllium or mercury pollutants if, in the judgment of the Administrator of the Environmental Protection Agency the emissions from the source comply with the appropriate standard or if the owners or operators of the source have requested a waiver of compliance or have been granted a waiver of compliance.

This application should accompany the report information provided in Section I.

1. Reason - State the reasons for requesting a waiver of emission testing. If the reason stated is that the emissions from the source are within the prescribed limits, documentation of this condition must be attached.

____

____

Date

Signature of the owner or operator

METHOD 101. REFERENCE METHOD FOR DETERMINATION OF PARTICULATE AND GASEOUS MERCURY EMISSIONS FROM STATIONARY SOURCES (AIR STREAMS)

1. *Principle and applicability*—1.1 *Principle.* Particulate and gaseous mercury emissions are isokinetically sampled from the source and collected in acidic iodine monochloride solution. The mercury collected (in the mercuric form) is reduced to elemental mercury in basic solution by hydroxylamine sulfate. Mercury is aerated from the solution and analyzed using spectrophotometry.

1.2 *Applicability.* This method is applicable for the determination of particulate and gaseous mercury emissions when the carrier gas stream is principally air. The method is for use in ducts or stacks at stationary sources. Unless otherwise specified, this method is not intended to apply to gas streams other than those emitted directly to the atmosphere without further processing.

2. *Apparatus*—2.1 *Sampling train.* A schematic of the sampling train used by EPA is shown in figure 101-1. Commercial models of this train are available, although construction details are described in APTD-0581,[1] and operating and maintenance procedures are described in APTD-0576. The components essential to this sampling train are the following:

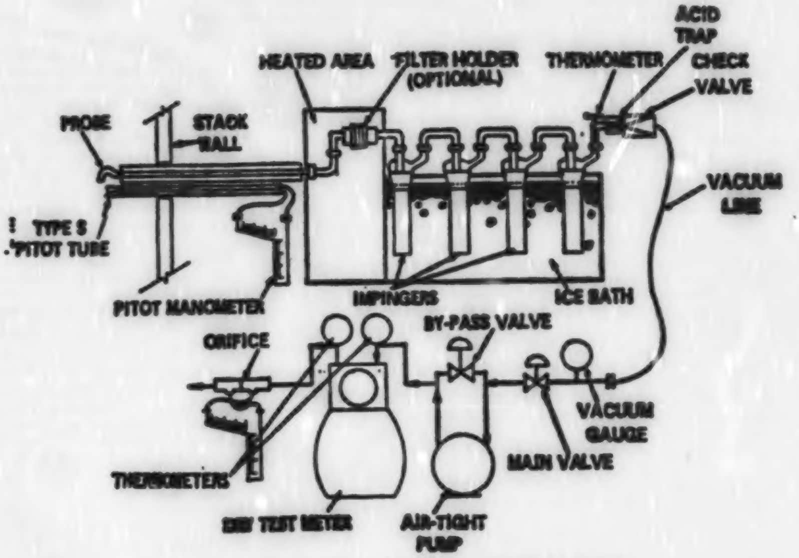

Figure 101-1. Mercury sampling train

2.1.1 *Nozzle.* Stainless steel or glass with sharp, tapered leading edge.

2.1.2 *Probe.* Sheathed Pyrex[2] glass. A heating system capable of maintaining a minimum gas temperature of 250° F at the probe outlet during sampling may be used to prevent condensation from occurring.

2.1.3 *Pitot tube.* Type S (Figure 101-2), or equivalent, with a coefficient within 5 percent over the working range, attached to probe to monitor stack gas velocity.

2.1.4 *Impingers.* Four Greenburg-Smith impingers connected in series with glass ball joint fittings. The first, third, and fourth impingers may be modified by replacing the tip with a one-half inch ID glass tube extending to one-half inch from the bottom of the flask.

2.1.5 *Acid Trap.* Mine Safety Appliances Air Line Filter, Catalogue Number 81857, with acid absorbing cartridge and suitable connections, or equivalent.

2.1.6 *Metering system.* Vacuum gauge, leakless pump, thermometers capable of measuring temperature to within 5° F, dry gas meter with 2 percent accuracy, and related equipment, described in APTD-0581, to maintain an isokinetic sampling rate and to determine sample volume.

2.1.7 *Filter Holder* (optional)-*Pyrex glass.* A filter may be used in cases where the gas stream to be sampled contains large quan-

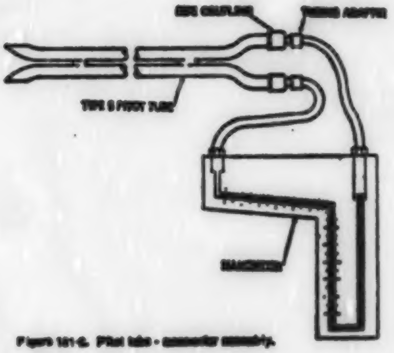

Figure 101-2. Pitot tube - manometer assembly.

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[1] These documents are available for a nominal cost from the National Technical Information Service, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Va. 22151.

[2] Mention of trade names or specific products does not constitute endorsement by the Environmental Protection Agency.

tities of particulate matter. The filter holder must provide a positive seal against leakage from outside or around the filter. A heating system capable of maintaining the filter at a minimum temperature of 250° F. should be used to prevent condensation from occurring.

2.1.8 *Barometer*. To measure atmospheric pressure to ±0.1 in Hg.

2.2 *Measurement of stack conditions (stack pressure, temperature, moisture and velocity)*—2.2.1 *Pitot tube*. Type S. or equivalent, with a coefficient within 5 percent over the working range.

2.2.2 *Differential pressure gauge*. Inclined manometer, or equivalent, to measure velocity held to within 10 percent of the minimum value. Micromanometers should be used if warranted.

2.2.3 *Temperature gauge*. Any temperature measuring device to measure stack temperature to within 1° F.

2.2.4 *Pressure gauge*. Pitot tube and inclined manometer, or equivalent, to measure stack pressure to within 0.1 in Hg.

2.2.5 *Moisture determination*. Wet and dry bulb thermometers, drying tubes, condensers, or equivalent, to determine stack gas moisture content to within 1 percent.

2.3 *Sample recovery*—2.3.1 *Leakless glass sample bottles*. 500 ml and 100 ml with Teflon lined tops.

2.3.2 *Graduated cylinder*. 250 ml.

2.3.3 *Plastic jar*. Approximately 300 ml.

2.4 *Analysis*—2.4.1 *Spectrophotometer*. To measure absorbance at 253.7 nm. Perkin Elmer Model 303, with a cylindrical gas cell (approximately 1.5 in. O.D. x 7 in.) with quartz glass windows, and hollow cathode source, or equivalent.

2.4.2 *Gas sampling bubbler*. Tudor Scientific Glass Co., Smog Bubbler, Catalogue No. TP-1150, or equivalent.

2.4.3. *Recorder*. To match output of spectrophotometer.

3. *Reagents*—3.1 *Stock reagents*—3.1.1 *Potassium iodide*. Reagent grade.

3.1.2 *Distilled water*—3.1.3 *Potassium iodide solution, 25 percent*. Dissolve 250 g of potassium iodide (reagent 3.1.1) in distilled water and dilute to 1 to 1.

3.1.4 *Hydrochloric acid*. Concentrated.

3.1.5. *Potassium iodate*. Reagent grade.

3.1.6 *Iodine monochloride (ICl) 1.0M*. To 800 ml. of 25% potassium iodide solution (reagent 3.1.3), add 800 ml. of concentrated hydrochloric acid. Cool to room temperature. With vigorous stirring, slowly add 135 g. of potassium iodate and continue stirring until all free iodine has dissolved to give a clear orange-red solution. Cool to room temperature and dilute to 1800 ml. with distilled water. The solution should be kept in amber bottles to prevent degradation.

3.1.7 *Sodium hydroxide pellets*. Reagent grade.

3.1.8 *Nitric acid*. Concentrated.

3.1.9 *Hydroxylamine sulfate*. Reagent grade.

3.1.10 *Sodium chloride*. Reagent grade.

3.1.11 *Mercuric chloride*. Reagent grade.

3.2 *Sampling*—3.2.1 *Absorbing solution, 0.1M ICl*. Dilute 100 ml. of the 1.0M ICl stock solution (reagent 3.1.6) to 1 to 1 with distilled water. The solution should be kept in glass bottles to prevent degradation. This reagent should be stable for at least 2 months; however, periodic checks should be performed to insure quality.

3.2.2 *Wash acid* 1:1 V/V nitric acid—water.

3.2.3 *Distilled, deionized water*.

3.2.4 *Silica gel*. Indicating type, 6 to 16 mesh dried at 350° F. for 2 hours.

3.2.5 *Filter* (*optional*). Glass fiber, Mine Safety Appliances 1106BH, or equivalent. A filter may be necessary in cases where the gas stream to be sampled contains large quantities of particulate matter.

3.3 *Analysis*—3.3.1 *Sodium hydroxide, 10 N.*—Dissolve 400 g of sodium hydroxide pellets in distilled water and dilute to 1 to 1.

3.3.2 *Reducing agent, 12 percent hydroxylamine sulfate, 12 percent sodium chloride.*—To 60 ml of distilled water, add 12 g of hydroxylamine sulfate and 12 g of sodium chloride. Dilute to 100 ml. This quantity is sufficient for 20 analyses and must be prepared daily.

3.3.3 *Aeration gas.*—Zero grade air.

3.3.4 *Hydrochloric acid, 0.3N.*—Dilute 25.5 ml of concentrated hydrochloric acid to 1 to 1 with distilled water.

3.4 *Standard mercury solutions*—3.4.1 *Stock solution.*—Add 0.1354 g of mercuric chloride to 80 ml of 0.3N hydrochloric acid. After the mercuric chloride has dissolved, add 0.3N hydrochloric acid and adjust the volume to 100 ml. One ml of this solution is equivalent to 1 mg of free mercury.

3.4.2 *Standard solutions.*—Prepare calibration solutions by serially diluting the stock solution (3.4.1) with 0.3N hydrochloric acid. Prepare solutions at concentrations in the linear working range for the instrument to be used. Soutions of 0.2 μg/ml, 0.4 μg/ml and 0.6 μg/ml have been found acceptable for most instruments. Store all solutions in glass-stoppered, glass bottles. These solutions should be stable for at least 3 months; however, periodic checks should be performed to insure quality.

4. *Procedure.*—4.1 Guidelines for source testing are detailed in the following sections. These guidelines are generally applicable; however, most sample sites differ to some degree and temporary alterations such as stack extensions or expansions often are required to ensure the best possible sample site. Further, since mercury is hazardous, care should be taken to minimize exposure. Finally, since the total quantity of mercury to be collected generally is small, the test must be carefully conducted to prevent contamination or loss of sample.

4.2 Selection of a sampling site and minimum number of traverse points:

4.2.1 Select a suitable sampling site that is as close as is practicable to the point of atmospheric emission. If possible, stacks smaller than 1 foot in diameter should not be sampled.

4.2.2 The sampling site should be at least eight stack or duct diameters downstream and two diameters upstream from any flow disturbance such as a bend, expansion, or contraction. For a rectangular cross section, determine an equivalent diameter from the following equation:

$$D_e=\frac{2LW}{L+W} \qquad \text{eq. 101-1}$$

where:

D_e = Equivalent diameter.

L = Length.

W = Width.

4.2.3 When the above sampling site criteria can be met, the minimum number of traverse points is four (4) for stacks 1 foot in diameter or less, eight (8) for stacks larger than 1 foot but 2 feet in diameter or less, and twelve (12) for stacks larger than 2 feet.

4.2.4 Some sampling situations may render the above sampling site criteria impractical. When this is the case, choose a convenient sampling location and use figure 101-3 to determine the minimum number of traverse points. However, use figure 101-3 only for stacks 1 foot in diameter or larger.

4.2.5 To use figure 101-3, first measure the distance from the chosen sampling location to the nearest upstream and downstream disturbances. Divide this distance by the diameter or equivalent diameter to determine the distance in terms of pipe diameters. Determine the corresponding number of traverse points for each distance from figure 101-3. Select the higher of the two numbers of traverse points, or a greater value, such that for circular stacks the number is a multiple of four, and for rectangular stacks the number follows the criteria of section 4.3.2.

4.2.6 If a selected sampling point is closer than 1 inch from the stack wall, adjust the location of that point to ensure that the sample is taken at least 1 inch away from the wall.

4.3 Cross sectional layout and location of traverse points:

4.3.1 For circular stacks locate the traverse points on at least two diameters according to figure 101-4 and table 101-1. The traverse axes shall divide the stack cross section into equal parts.

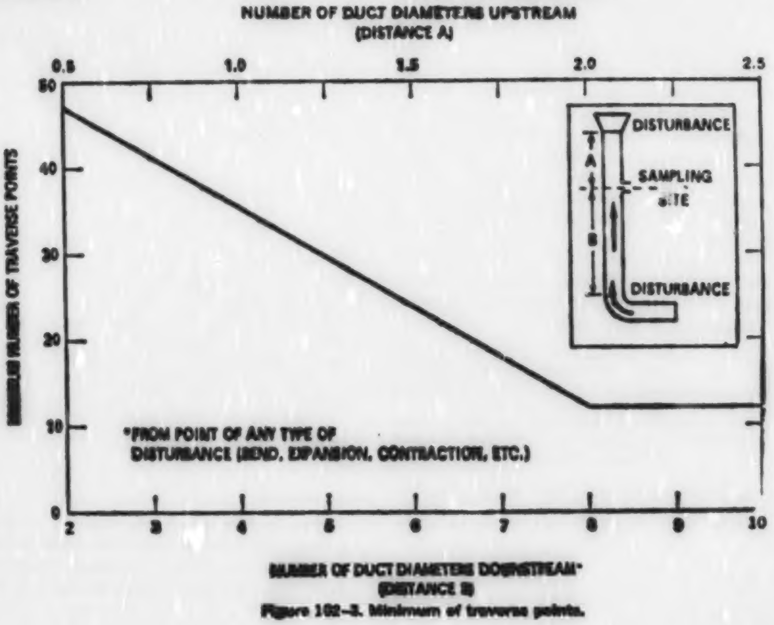

Figure 102–3. Minimum of traverse points.

Table 101-1. Location of traverse points in circular stacks
(Percent of stack diameter from inside wall to traverse point)

Traverse point number on a diameter	Number of traverse points on a diameter											
	2	4	6	8	10	12	14	16	18	20	22	24
1	14.6	6.7	4.4	3.3	2.5	2.1	1.8	1.6	1.4	1.3	1.1	1.1
2	85.4	25.0	14.7	10.5	8.2	6.7	5.7	4.9	4.4	3.9	3.5	3.2
3		75.0	29.5	19.4	14.6	11.8	9.9	8.5	7.5	6.7	6.0	5.5
4		93.3	70.5	32.3	22.6	17.7	14.6	12.5	10.9	9.7	8.7	7.9
5			85.3	67.7	34.2	25.0	20.1	16.9	14.6	12.9	11.6	10.5
6			95.6	80.6	65.8	35.5	26.9	22.0	18.8	16.5	14.6	13.2
7				89.5	77.4	64.5	36.6	28.3	23.6	20.4	18.0	16.1
8				96.7	85.4	75.0	63.4	37.5	29.6	25.0	21.8	19.4
9					91.8	82.3	73.1	62.5	38.2	30.6	26.1	23.0
10					97.5	88.2	79.9	71.7	61.8	38.8	31.5	27.2
11						93.3	85.4	78.0	70.4	61.2	39.3	32.3
12						97.9	90.1	83.1	76.4	69.4	60.7	39.8
13							94.3	87.5	81.2	75.0	68.5	60.2
14							98.2	91.5	85.4	79.6	73.9	67.7
15								95.1	89.1	83.5	78.2	72.8
16								98.4	92.5	87.1	82.0	77.0
17									95.6	90.3	85.4	80.6
18									98.6	93.3	88.4	83.9
19										96.1	91.3	86.8
20										98.7	94.0	89.5
21											96.5	92.1
22											98.9	94.5
23												96.8
24												98.9

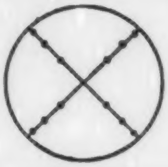

Figure 101-4. Cross section of circular stack showing location of traverse points on perpendicular diameters.

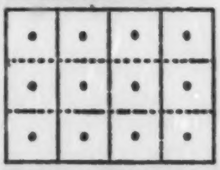

Figure 101-5. Cross section of rectangular stack divided into 12 equal areas, with traverse points at centroid of each area.

4.3.2 For rectangular stacks divide the cross section into as many equal rectangular areas as traverse points, such that the ratio of the length to the width of the elemental areas is between one and two. Locate the traverse points at the centroid of each equal area according to figure 101-5.

4.4 Measurement of stack conditions:

4.4.1 Set up the apparatus as shown in figure 101-2. Make sure all connections are tight and leak-free. Measure the velocity head and temperature at the traverse points specified by section 4.2 and 4.3.

4.4.2 Measure the static pressure in the stack.

4.4.3 Determine the stack gas moisture.

4.4.4 Determine the stack gas molecular weight from the measured moisture content and knowledge of the expected gas stream composition. A standard Orsat analyzer has been found valuable at combustion sources. In all cases, sound engineering judgment should be used.

4.5 **Preparation of sampling train:**

4.5.1 Prior to assembly, clean all glassware (probe, impingers, and connectors) by rinsing with wash acid, tap water, 0.1M ICl, tap water, and finally distilled water. Place 100 ml of 0.1M ICl in each of the first three impingers, and place approximately 200 g of preweighed silica gel in the fourth impinger. Save 50 ml of the 0.1M ICl as a blank in the sample analysis. Set up the train and the probe as in figure 101-1.

4.5.2 If the gas stream to be sampled is excessively dirty or moist, the first impinger may clog or become dilute too rapidly for sufficient testing. A filter can be placed ahead of the impingers to collect the particulates. An initial empty impinger may also be used to remove excess moisture. If a fifth impinger is required, the final impinger may have to be carefully taped to the outside of the sample box.

4.5.3 Leak check the sampling train at the sampling site. The leakage rate should not be in excess of 1 percent of the desired sampling rate. If condensation in the probe or filter is a problem, probe and filter heaters will be required. Adjust the heaters to provide a temperature of at least 250° F. Place crushed ice around the impingers. Add more ice during the test to keep the temperature of the gases leaving the last impinger at 70° F or less.

4.6 **Mercury train operation:**

4.6.1 For each run, record the data required on the example sheet shown in figure 101-6. Take readings at each sampling point at least every 5 minutes and when significant changes in stack conditions necessitate additional adjustments in flow rate.

4.6.2 Sample at a rate of 0.5 to 1.0 cfm. Samples shall be taken over such a period or periods as are necessary to accurately determine the maximum emissions which would occur in a 24-hour period. In the case of cyclic operations, sufficient tests shall be made so as to allow accurate determination or calculation of the emissions which will occur over the duration of the cycle. A minimum sample time of 2 hours is recommended. In some instances, high mercury concentrations can prevent sampling in one run for the desired minimum time. This is indicated by reddening in the first impinger as free iodine is liberated. In this case, a run may be divided into two or more subruns to ensure that the absorbing solutions are not depleted.

PLANT ____________
LOCATION ____________
OPERATOR ____________
DATE ____________
RUN NO. ____________
SAMPLE BOX NO. ____________
METER BOX NO. ____________
METER ΔH@ ____________
C FACTOR ____________

SCHEMATIC OF STACK CROSS SECTION

AMBIENT TEMPERATURE ____________
BAROMETRIC PRESSURE ____________
ASSUMED MOISTURE, % ____________
HEATER BOX SETTING ____________
PROBE LENGTH, m. ____________
NOZZLE DIAMETER, in. ____________
PROBE HEATER SETTING ____________

TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	STATIC PRESSURE (P_s), in. Hg	STACK TEMPERATURE (T_s), °F	VELOCITY HEAD (ΔP_s).	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH), in. H_2O	GAS SAMPLE VOLUME (V_m), ft³	GAS SAMPLE TEMPERATURE AT DRY GAS METER		SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
							INLET ($T_{m_{in}}$), °F	OUTLET ($T_{m_{out}}$), °F		
TOTAL							Avg.	Avg.		
AVERAGE							Avg.			

Figure 101-6. Field data

4.6.3 To begin sampling, position the nozzle at the first traverse point with the tip pointing directly into the gas stream. Immediately start the pump and adjust the flow to isokinetic conditions. Sample for at least 5 minutes at each traverse point; sampling time must be the same for each point. Maintain isokinetic sampling throughout the sampling period. Nomographs which aid in the rapid adjustment of the sampling rate without other computations are in APTD-0576 and are available from commercial suppliers. Note the standard nomographs are applicable only for type S pitot tubes and air or a stack gas with an equivalent density. Contact EPA or the sampling train supplier for instructions when the standard nomograph is not applicable.

4.6.4 Turn off the pump at the conclusion of each run and record the final readings. Immediately remove the probe and nozzle from the stack and handle in accordance with the sample recovery process described in section 4.7.

4.7 **Sample recovery:**

4.7.1 (All glass storage bottles and the graduated cylinder must be precleaned as in section 4.5.1). This operation should be performed in an area free of possible mercury contamination. Industrial laboratories and ambient air around mercury-using facilities are not normally free of mercury contamination. When the sampling train is moved, care must be exercised to prevent breakage and contamination.

4.7.2 Disconnect the probe from the impinger train. Place the contents (measured to ±1 ml) of the first three impingers into a 500 ml sample bottle. Rinse the probe and all glassware between it and the back half of the third impinger with two 50 ml portions of 0.1M ICl solution. Add these rinses to the first sample bottle. For a blank, place 50 ml of the 0.1M ICl in a 100 ml sample bottle. If used, place the filter along with 100 ml of 0.1M ICl in another 100 ml sample bottle. Retain a filter blank. Place the silica gel in the plastic jar. Seal and secure all containers for shipment. If an additional test is desired, the glassware can be carefully double rinsed with distilled water and reassembled. However, if the glassware is to be out of use more than 2 days, the initial acid wash procedure must be followed.

4.8 **Analysis:**

4.8.1 *Apparatus preparation.*—Clean all glassware according to the procedure of section 4.5.1. Adjust the instrument settings according to the instrument manual, using an absorption wavelength of 253.7 nm.

4.8.2 *Analysis preparation.*—Adjust the air delivery pressure and the needle valve to obtain a constant airflow of about 1.3 to 1/min. The analysis tube should be bypassed except during aeration. Purge the equipment for 2 minutes. Prepare a sample of mercury standard solution (3.4.2) according to section 4.8.3. Place the analysis tube in the line, and aerate until a maximum peak height is reached on the recorder. Remove the analysis tube, flush the lines, and rinse the analysis tube with distilled water. Repeat with another sample of the same standard solution. This purge and analysis cycle is to be repeated until peak heights are reproducible.

4.8.3 *Sample preparation.*—Just prior to analysis, transfer a sample aliquot of up to 50 ml to the cleaned 100 ml analysis tube. Adjust the volume to 50 ml with 0.1M ICl if required. Add 5 ml of 10 N sodium hydroxide, cap tube with a clean glass stopper and shake vigorously. Prolonged, vigorous shaking at this point is necessary to obtain an accurate analysis. Add 5 ml of the reducing agent (reagent 3.3.2), cap tube with a clean glass stopper and shake vigorously and immediately in sample line.

4.8.4 *Mercury determination.*—After the system has been stabilized, prepare samples from the sample bottle according to section 4.8.3. Aerate the sample until a maximum peak height is reached on the recorder. The mercury content is determined by comparing the peak heights of the samples to the peak heights of the calibration solutions. If collected samples are out of the linear range, the samples should be diluted. Prepare a blank from the 100 ml bottle according to section 4.8.3 and analyze to determine the reagent blank mercury level.

5. *Calibration.*—5.1 *Sampling train.*—5.1.1 Use standard methods and equipment as detailed in APTD-0576 to calibrate the rate meter, pitot tube, dry gas meter, and probe heater (if used). Recalibrate prior to each test series.

5.2 *Analysis.*—5.2.1 Prepare a calibration curve for the spectrophotometer using the standard mercury solutions. Plot the peak heights read on the recorder versus the concentrations of mercury in the standard solutions. Standards should be interspersed with the samples since the calibration can change slightly with time. A new calibration curve should be prepared for each new set of samples run.

6. *Calculations.*—6.1 Average dry gas meter temperature, stack temperature, stack pressure and average orifice pressure drop. See data sheet (fig. 101-6).

6.2 *Dry gas volume.*—Correct the sample volume measured by the dry gas meter to stack conditions by using equation 101-2.

$$V_{m_s} = V_m \frac{T_s}{T_m} \frac{\left(P_{bar} + \frac{\Delta H}{13.6}\right)}{P_s}$$

eq. 101-2

where:

V_{m_s} = Volume of gas sample through the dry gas meter (stack conditions), ft³.
V_m = Volume of gas sample through the dry gas meter (meter conditions), ft³.
T_s = Average temperature of stack gas, °R.
T_m = Average dry gas meter temperature, °R.
P_{bar} = Barometric pressure at the orifice meter, inHg.
ΔH = Average pressure drop across the orifice meter, inH_2O.
13.6 = Specific gravity of mercury.
P_s = Stack pressure, P_{bar} ± static pressure, inHg.

6.3 *Volume of water vapor.*

$$V_{w_s} = K_w V_{l_c} \frac{T_s}{P_s} \qquad \text{eq. 101-3}$$

where:

V_{w_s} = Volume of water vapor in the gas sample (stack conditions), ft³.

$K_w = 0.00267 \frac{\text{in. Hg.-ft}^3}{\text{ml.-°R}}$, when these units are used.

V_{l_c} = Total volume of liquid collected in impingers and silica gel (see figure 101-7), ml.

T_s = Average stack gas temperature, °R.

P_s = Stack pressure, P_{bar} ± static pressure, in. Hg.

6.4 Total gas volume.

$$V_{total} = V_{m_s} + V_{w_s} \qquad \text{eq. 101-4}$$

where:

V_{total} = Total volume of gas sample (stack conditions), ft³.

V_{m_s} = Volume of gas through gas meter (stack conditions), ft³.

V_{w_s} = Volume of water vapor in gas sample (stack conditions), ft³.

	VOLUME OF LIQUID WATER COLLECTED	
	IMPINGER VOLUME, ml	SILICA GEL WEIGHT, g
FINAL		
INITIAL		
LIQUID COLLECTED		
TOTAL VOLUME COLLECTED		g* ml

CONVERT WEIGHT OF WATER TO VOLUME BY dividing total weight INCREASE BY DENSITY OF WATER. (1 g/ml):

$$\frac{\text{INCREASE, g}}{(1\ \text{g/ml})} = \text{VOLUME WATER, ml}$$

Figure 101-7. Analytical data.

6.5 Stack gas velocity. Use equation 101-5 to calculate the stack gas velocity.

$$(v_s)_{avg.} = K_p C_p (\sqrt{\Delta P})_{avg.} \sqrt{\frac{(T_s)_{avg.}}{P_s M_s}}$$

eq. 101-5

where:

$(v_s)_{avg.}$ = Average stack gas velocity, feet per second.

$K_p = 85.53 \frac{\text{ft.}}{\text{sec.}} \left(\frac{\text{lb.-in. Hg}}{\text{lb. mole-°R-in. H}_2\text{O}} \right)^{1/2}$, when these units are used.

C_p = Pitot tube coefficient, dimensionless.

$(T_s)_{avg.}$ = Average stack gas temperature, °R.

$(\sqrt{\Delta P})_{avg.}$ = Average square root of the velocity head of stack gas (in. H_2O)$^{1/2}$ (see fig. 101-8).

P_s = Stack pressure, P_{bar} ± static pressure, in. Hg.

M_s = Molecular weight of stack gas (wet basis), the summation of the products of the molecular weight of each component multiplied by its volumetric proportion in the mixture, lb./lb. mole.

Figure 101-8 shows a sample recording sheet for velocity traverse data. Use the averages in the last two columns of figure 101-8 to determine the average stack gas velocity from equation 101-5.

6.6 Mercury collected. Calculate the total weight of mercury collected by using equation 101-6.

$$W_t = V_t C_t - V_b C_b \ (+ V_f C_f) \ \text{..eq. 101-6}$$

where:

W_t = total weight of mercury collected, μg.

PLANT________________________

DATE________________________

RUN NO.________________________

STACK DIAMETER, In.________________________

BAROMETRIC PRESSURE, In. Hg.________________________

STATIC PRESSURE IN STACK (P_g), In. Hg.________________________

OPERATORS________________________

SCHEMATIC OF STACK CROSS SECTION

Traverse point number	Velocity head, in. H_2O	$\sqrt{\Delta_p}$	Stack Temperature (T_S), °F
	AVERAGE:		

Figure 101-8. Velocity traverse data.

V_t = Total volume of condensed moisture and ICl in sample bottle, ml.

C_t = Concentration of mercury measured in sample bottle, $\mu g/ml$.

V_b = Total volume of ICl used in sampling (impinger contents and all wash amounts), ml.

C_b = Blank concentration of mercury in ICl solution, $\mu g/ml$.

V_f = Total volume of ICl used in filter bottle (if used), ml.

C_f Concentration of mercury in filter bottle (if used), $\mu g/ml$.

6.7 Total mercury emission. Calculate the total amouut of mercury emitted from each stack per day by equation 101-7. This equation is applicable for continuous operations. For cyclic operations, use only the time per day each stack is in operation. The total mercury emissions from a source will be the summation of results from all stacks.

$$R = \frac{W_t (v_s)_{avg.} A_s}{V_{total}} \times \frac{86{,}400 \text{ seconds/day}}{10^6 \mu g/g.} \qquad \text{eq. 101-7}$$

where:

R = Rate of emission, g/day.

W_t = Total weight of mercury collected, μg.

V_{total} = Total volume of gas sample (stack conditions), ft^3.

$(v_s)_{avg.}$ = Average stack gas velocity, feet per second.

A_s = Stack area, ft^2.

6.8 Isokinetic variation (comparison of velocity of gas in probe tip to stack velocity).

$$I = \frac{100 V_{total}}{A_n \Theta (v_s)_{avg.}} \qquad \text{eq. 101-8}$$

where:

I = Percent of isokinetic sampling.

V_{total} = Total volume of gas sample (stack conditions), ft^3.

A_n = Probe tip area, ft^2.

Θ = Sampling time, sec.

$(v_s)_{avg.}$ = Average stack gas velocity, feet per second.

7. *Evaluation of results*—7.1 *Determination of compliance.*—7.1.1 Each performance test shall consist of three repetitions of the applicable test method. For the purpose of determining compliance with an applicable national emission standard, the average of results of all repetitions shall apply.

7.2 *Acceptable isokinetic results.*—7.2.1 The following range sets the limit on acceptable isokinetic sampling results:

If $90\% \leq I \leq 110\%$, the results are acceptable; otherwise, reject the test and repeat.

8. *References.*—1. Addendum to Specifications for Incinerator Testing at Federal Facilities, PHS, NCAPC, Dec. 6, 1967.

2. Determining Dust Concentration in a Gas Stream, ASME Performance Test Code No. 27, New York, N.Y., 1957.

3. Devorkin, Howard, et al., Air Pollution Source Testing Manual, Air Pollution Control District, Los Angeles, Calif., Nov. 1963.

4. Hatch, W. R. and W. L. Ott, "Determination of Sub-Microgram Quantities of Mercury by Atomic Absorption Spectrophotometry," Anal. Chem., 40:2085–87, 1968.

5. Mark, L. S., Mechanical Engineers' Handbook, McGraw-Hill Book Co., Inc., New York, N.Y., 1951.

6. Martin, Robert M., Construction Details of Isokinetic Source Sampling Equipment, Environmental Protection Agency, APTD-0581.

7. Methods for Determination of Velocity, Volume, Dust and Mist Content of Gases, Western Precipitation Division of Joy Mfg. Co., Los Angeles, Calif. Bul. WP-50, 1968.

8. Perry, J. H., Chemical Engineers' Handbook, McGraw-Hill Book Co., Inc., New York, N.Y., 1960.

9. Rom, Jerome J., Maintenance, Calibration, and Operation of Isokinetic Source Sampling Equipment, Environmental Protection Agency, APTD-0576.

10. Shigehara, R. T., W. F. Todd, and W. S. Smith, Significance of Errors in Stack Sampling Measurements, Paper presented at the Annual Meeting of the Air Pollution Control Association, St. Louis, Mo., June 14–19, 1970.

11. Smith, W. S., et al., Stack Gas Sampling Improved and Simplified with New Equipment, APCA paper No. 67-119, 1967.

12. Smith, W. S., R. T. Shigehara, and W. F. Todd, A Method of Interpreting Stack Sampling Data, Paper presented at the 63d Annual Meeting of the Air Pollution Control Association, St. Louis, Mo., June 14–19, 1970.

13. Specifications for Incinerator Testing at Federal Facilities PHS, NCAPC, 1967.

14. Standard Method for Sampling Stacks for Particulate Matter, In: 1971 Book of ASTM Standards, part 23, Philadelphia, 1971, ASTM Designation D-2928-71.

15. Vennard, J. K., Elementary Fluid Mechanics, John Wiley and Sons, Inc., New York, 1947.

METHOD 102. REFERENCE METHOD FOR DETERMINATION OF PARTICULATE AND GASEOUS MERCURY EMISSIONS FROM STATIONARY SOURCES (HYDROGEN STREAMS)

1. *Principle and applicability*—1.1 *Principle*.—Particulate and gaseous mercury emissions are isokinetically sampled from the source and collected in acidic iodine monochloride solution. The mercury collected (in the mercuric form) is reduced to elemental mercury in basic solution by hydroxylamine sulfate. Mercury is aerated from the solution and analyzed using spectrophotometry.

1.2 *Applicability*.—This method is applicable for the determination of particulate and gaseous mercury emissions when the carrier gas stream is principally hydrogen. The method is for use in ducts or stacks at stationary sources. Unless otherwise specified, this method is not intended to apply to gas streams other than those emitted directly to the atmosphere without further processing.

2. *Apparatus*—2.1 *Sampling train*.—A schematic of the sampling train used by EPA is shown in figure 102-1. Commercial models of this train are available, although complete construction details are described in APTD-0581,[1] and operating and maintenance procedures are described in APTD-0576. The components essential to this sampling train are the following:

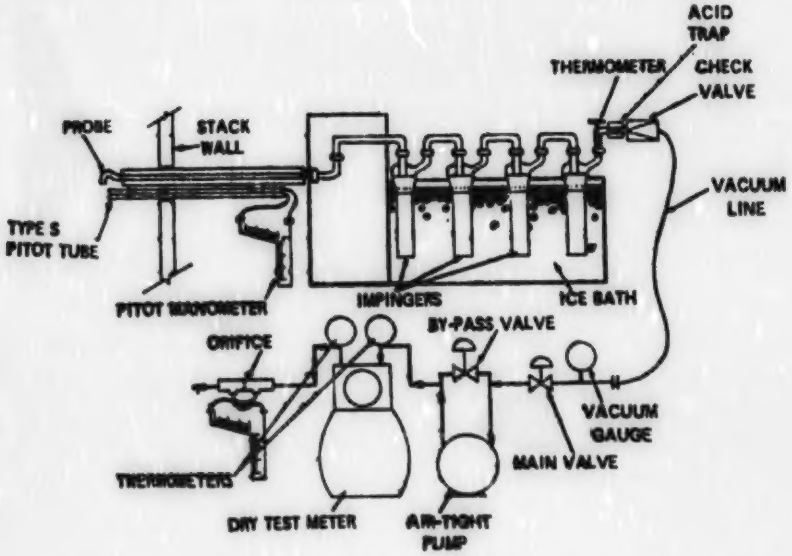

Figure 102-1. Mercury sampling train

2.1.1 *Nozzle*. Stainless steel or glass with sharp, tapered leading edge.

2.1.2 *Probe*. Sheathed Pyrex[2] glass.

2.1.3 *Pitot tube*. Type S (figure 102-2), or equivalent, with a coefficient within 5 percent over the working range, attached to probe to monitor stack gas velocity.

2.1.4 *Impingers*. Four Greenburg-Smith impingers connected in series with glass ball-joint fittings. The first, third, and fourth impingers may be modified by replacing the tip with one-half inch ID glass tube extending to one-half inch from the bottom of the flask.

2.1.5 *Acid trap*. Mine safety appliances air line filter, catalogue No. 81857, with acid absorbing cartridge and suitable connections, or equivalent.

2.1.6 *Metering system*. Vacuum gage, leakless pump, thermometers capable of measuring temperature to within 5°F, dry gas meter with 2 percent accuracy, and related equipment, described in APTD-0581, to maintain an isokinetic sampling rate and to determine sample volume.

2.1.7 *Barometer*. To measure atmospheric pressure to ± 0.1 in hg.

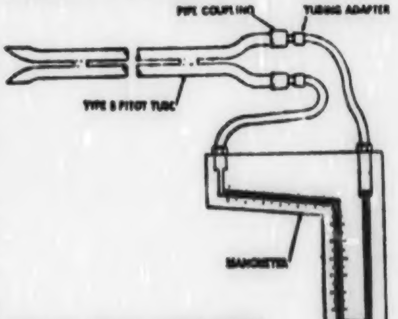

Figure 102-2. Pitot tube - manometer assembly.

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[1] These documents are available for a nominal cost from the National Technical Information Service, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Va. 22151.

[2] Mention of trade names or commercial products does not constitute endorsement by the Environmental Protection Agency.

2.2 *Measurement of stack conditions (stack pressure, temperature, moisture, and velocity)*—2.2.1 *Pitot tube*. Type S, or equivalent, with a coefficient within 5 percent over theworking range.

2.2.2 *Differential pressure gage*. Inclined manometer, or equivalent, to measure velocity head to within 10 percent of the minimum value. Micromanometers should be used if warranted.

2.2.3 *Temperature gage*. Any temperature-measuring device to measure stack temperature to within 1° F.

2.2.4 *Pressure gage*. Pitot tube and inclined manometer, or equivalent, to measure stack pressure to within 0.1 in hg.

2.2.5 *Moisture determination*. Drying tubes, condensers, or equivalent, to determine stack gas moisture content in hydrogen to within 1 percent.

2.3 *Sample recovery*—2.3.1 *Leakless glass sample bottles*. 500 ml and 200 ml with Teflon-lined tops.

2.3.2 *Graduated cylinder*. 250 ml.

2.3.3 *Plastic jar*. Approximately 300 ml.

2.4 *Analysis*—2.4.1 *Spectrophotometer*. To measure absorbance at 253.7 nm. Perkin Elmer model 303, with a cylindrical gas cell (approximately 1.5 in o.d. x 7 in) with quartz glass windows, and hollow cathode source, or equivalent.

2.4.2 *Gas sampling bubbler*. Tudor Scientific Co. Smog Bubbler, catalogue No. TP-1150, or equivalent.

2.4.3 *Recorder*. To match output of spectrophotometer.

3. *Reagents*.—3.1 Stock reagents.—3.1.1 Potassium iodide. Reagent grade.

3.1.2 *Distilled water*.

3.1.3 *Potassium iodide solution, 25 percent*.—Dissolve 250 g of potassium iodide (reagent 3.1.1) in distilled water and dilute to 1 to 1.

3.1.4 *Hydrochloric acid*. Concentrated.

3.1.5 *Potassium iodate*. Reagent grade.

3.1.6 *Iodine monochloride (ICl) 1.0M*. To 800 ml of 25 percent potassium iodide solution (reagent 3.1.3), add 800 ml of concentrated hydrochloric acid. Cool to room temperature. With vigorous stirring, slowly add 135 g of potassium iodate and continue stirring until all free iodine has dissolved to give a clear orange-red solution. Cool to room temperature and dilute to 1,800 ml with distilled water. The solution should be kept in amber bottles to prevent degradation.

3.1.7 *Sodium hydroxide pellets*. Reagent grade.

3.1.8 *Nitric acid*. Concentrated.

3.1.9 *Hydroxylamine sulfate*. Reagent grade.

3.1.10 *Sodium chloride*. Reagent grade.

3.1.11 *Mercuric chloride*. Reagent grade.

3.2 *Sampling*. 3.2.1 *Absorbing solution, 0.1M ICl*. Dilute 100 ml of the 1.0M ICl stock solution (reagent 3.1.6) to 1 l with distilled water. The solution should be kept in glass bottles to prevent degradation. This reagent should be stable for at least 2 months; however, periodic checks should be performed to insure quality.

3.2.2 *Wash acid*. 1:1 V/V nitric acid-water.

3.2.3 *Distilled, deionized water*.

3.2.4 *Silica gel*. Indicating type, 6 to 16 mesh, dried at 350°F for 2 hours.

3.3. *Analysis*—3.3.1 *Sodium hydroxide, 10N*. Dissolve 400 g of sodium hydroxide pellets in distilled water and dilute to 1 l.

3.3.2 *Reducing agent, 12 percent hydroxylamine sulfate, 12 percent sodium chloride*. To 60 ml of distilled water, add 12 g of hydroxylamine sulfate and 12 g of sodium chloride. Dilute to 100 ml. This quantity is sufficient for 20 analyses and must be prepared daily.

3.3.3 *Aeration gas*. Zero grade air.

3.3.4 *Hydrochloric acid, 0.3N*. Dilute 25.5 ml of concentrated hydrochloric acid to 1 l with distilled water.

3.4 *Standard mercury solutions*—3.4.1 *Stock solution*. Add 0.1354 g of mercuric chloride to 80 ml of 0.3N hydrochloric acid. After the mercuric chloride has dissolved, add 0.3N hydrochloric acid and adjust the volume to 100 ml. One ml of this solution is equivalent to 1 mg of free mercury.

3.4.2 *Standard solutions*. Prepare calibration solutions by serially diluting the stock solution (3.4.1) with 0.3N hydrochloric acid. Prepare solutions at concentrations in the linear working range for the instrument to be used. Solutions of 0.2 μg/ml, 0.4 μg/ml and 0.6 μg/ml have been found acceptable for most instruments. Store all solutions in glass-stoppered, glass bottles. These solutions should be stable for at least 2 months; however, periodic checks should be performed to insure quality.

4. *Procedure*. 4.1 Guidelines for source testing are detailed in the following sections. These guidelines are generally applicable; however, most sample sites differ to some degree and temporary alterations such as stack extensions or expansions often are required to insure the best possible sample site. Further, since mercury is hazardous, care should be taken to minimize exposure. Finally, since the total quantity of mercury to be collected generally is small, the test must be carefully conducted to prevent contamination or loss of sample.

4.2 Selection of a sampling site and minimum number of traverse points.

4.2.1 Select a suitable sampling site that is as close as is practicable to the point of atmospheric emission. If possible, stacks smaller than 1 foot in diameter should not be sampled.

4.2.2 The sampling site should be at least eight stack or duct diameters downstream and two diameters upstream from any flow disturbance such as a bend, expansion or contraction. For rectangular cross section, determine an equivalent diameter from the following equation:

$$D_e = \frac{2LW}{L+W} \qquad \text{eq. 102-1}$$

where:

D_e = equivalent diameter.
L = length.
W = width.

4.2.3 When the above sampling site criteria can be met, the minimum number of traverse points is four (4) for stacks 1 foot in diameter or less, eight (8) for stacks larger than 1 foot but 2 feet in diameter or less, and twelve (12) for stacks larger than 2 feet.

4.2.4 Some sampling situations may render the above sampling site criteria impractical. When this is the case, choose a convenient sampling location and use figure 102-3 to determine the minimum number of traverse points. However, use figure 102-3 only for stacks 1 foot in diameter or larger.

4.2.5 To use figure 102-3, first measure the distance from the chosen sampling location to the nearest upstream and downstream disturbances. Divide this distance by the diameter or equivalent diameter to determine the distance in terms of pipe diameters. Determine the corresponding number of traverse points for each distance from figure 102-3. Select the higher of the two numbers of traverse points, or a greater value, such that for circular stacks the number is a multiple of four, and for rectangular stacks the number follows the criteria of section 4.2.2.

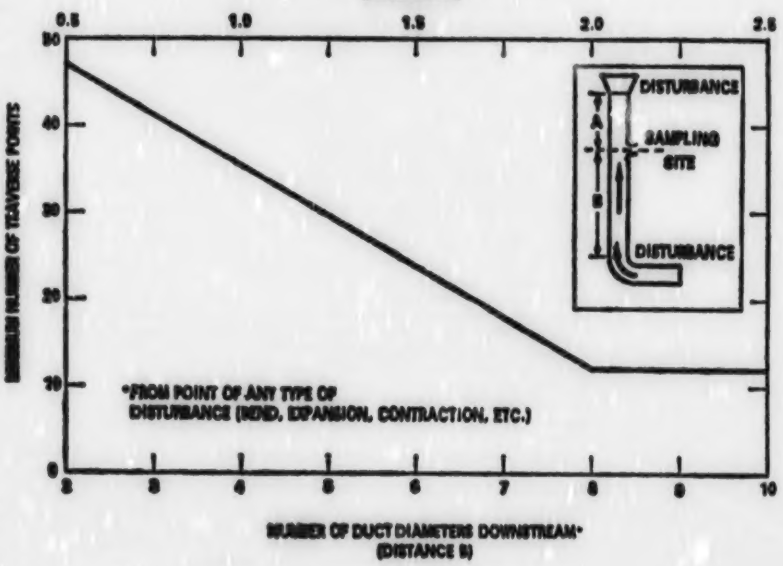

Figure 104-3. Minimum number of traverse points.

4.2.6 If a selected sampling point is closer than 1 inch from stack wall, adjust the location of that point to insure that the sample is taken at least 1 inch away from the wall.

4.3 Cross-sectional layout and location of traverse points.

4.3.1 For circular stacks locate the traverse points on at least two diameters according to figure 102-4 and table 102-1. The traverse axes shall divide the stack-cross section into equal parts.

4.3.2 For rectangular stacks divide the cross-section into as many equal rectangular areas as traverse points, such that the ratio of the length to the width of the elemental areas is between one and two. Locate the traverse points at the centroid of each equal area according to figure 102-5.

4.4 Measurement of stack conditions.

4.4.1 Set up the apparatus as shown in figure 102-2. Make sure all connections are tight and leak free. Measure the velocity head and temperature at the traverse points specified by section 4.2 and 4.3.

4.4.2 Measure the static pressure in the stack.

4.4.3 Determine the stack gas moisture.

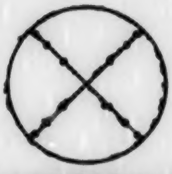

Figure 102-4. Cross section of circular stack showing location of traverse points on perpendicular diameters.

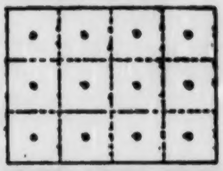

Figure 102-5. Cross section of rectangular stack divided into 12 equal areas, with traverse points at centroid of each area.

Table 102-1. Location of traverse points in circular stacks
(Percent of stack diameter from inside wall to traverse point)

Traverse point number on a diameter	Number of traverse points on a diameter											
	2	4	6	8	10	12	14	16	18	20	22	24
1	14.6	6.7	4.4	3.3	2.5	2.1	1.8	1.6	1.4	1.3	1.1	1.1
2	85.4	25.0	14.7	10.5	8.2	6.7	5.7	4.9	4.4	3.9	3.5	3.2
3		75.0	29.5	19.4	14.6	11.8	9.9	8.5	7.5	6.7	6.0	5.5
4		93.3	70.5	32.3	22.6	17.7	14.6	12.5	10.9	9.7	8.7	7.9
5			85.3	67.7	34.2	25.0	20.1	16.9	14.6	12.9	11.6	10.5
6			95.6	80.6	65.8	35.5	26.9	22.0	18.8	16.5	14.6	13.2
7				89.5	77.4	64.5	36.6	28.3	23.6	20.4	18.0	16.1
8				96.7	85.4	75.0	63.4	37.5	29.6	25.0	21.8	19.4
9					91.8	82.3	73.1	62.5	38.2	30.6	26.1	23.0
10					97.5	88.2	79.9	71.7	61.8	38.8	31.5	27.2
11						93.3	85.4	78.0	70.4	61.2	39.3	32.3
12						97.9	90.1	83.1	76.4	69.4	60.7	39.8
13							94.3	87.5	81.2	75.0	68.5	60.2
14							98.2	91.5	85.4	79.6	73.9	67.7
15								95.1	89.1	83.5	78.2	72.8
16								98.4	92.5	87.1	82.0	77.0
17									95.6	90.3	85.4	80.6
18									98.6	93.3	88.4	83.9
19										96.1	91.3	86.8
20										98.7	94.0	89.5
21											96.5	92.1
22											98.9	94.5
23												96.8
24												98.9

4.4.4 Determine the stack gas molecular weight from the measured moisture content and knowledge of the expected gas stream composition. Sound engineering judgment should be used.

4.5 Preparation of sampling train.

4.5.1 *Prior to assembly*, clean all glassware (probe, impingers, and connectors) by rinsing with wash acid, tap water, 0.1M ICl, tap water, and finally distilled water. Place 100 ml of 0.1M ICl in each of the first three impingers, and place approximately 200 g of preweighed silica gel in the fourth impinger. Save 80 ml of the 0.1M ICl as a blank in the sample analysis. Set up the train and the probe as in Figure 102-1.

4.5.2 Leak check the sampling train at the sampling site. The leakage rate should not be in excess of 1 percent of the desired sampling rate. Place crushed ice around the impingers. Add more ice during the run to keep the temperature of the gases leaving the last impinger at 70° F or less.

4.6 Mercury train operation.

4.6.1 Safety procedures. It is imperative that the sampler conduct the source test under conditions of utmost safety, since hydrogen and air mixtures are explosive. The sample train essentially is leakless, so that attention to safe operation can be concentrated at the inlet and outlet. The following specific items are recommended:

4.6.1.1 Operate only the vacuum pump during the test. The other electrical equipment, e.g. heaters, fans and timers, normally are not essential to the success of a hydrogen stream test.

4.6.1.2 Seal the sample port to minimize leakage of hydrogen from the stack.

4.6.1.3 Vent sampled hydrogen at least 10 feet away from the train. This can be accomplished easily by attaching a ½-in i.d. Tygon tube to the exhaust from the orifice meter.

4.6.2 For each run, record the data required on the sample sheet shown in figure 102-6. Take readings at each sampling point at least every 5 minutes and when significant changes in stack conditions necessitate additional adjustments in flow rate.

4.6.3 Sample at a rate of 0.5 to 1.0 cfm. Samples shall be taken over such a period or periods as are necessary to accurately determine the maximum emissions which would occur in a 24-hour period. In the case of cyclic operations, sufficient tests shall be made so as to allow accurate determination or calculation of the emissions which will occur over the duration of the cycle. A minimum sample time of 2 hours is recommended. In some instances, high mercury concentrations can prevent sampling in one run for the desired minimum time. This is indicated by reddening in the first impinger as free iodine is liberated. In this case, a run may be divided into two or more subruns to insure that the absorbing solutions are not depleted.

PLANT ____________
LOCATION ____________
OPERATOR ____________
DATE ____________
RUN NO. ____________
SAMPLE BOX NO. ____________
METER BOX NO. ____________
METER $\Delta H_{@}$ ____________
C FACTOR ____________

SCHEMATIC OF STACK CROSS SECTION

AMBIENT TEMPERATURE ________
BAROMETRIC PRESSURE ________
ASSUMED MOISTURE, % ________

PROBE LENGTH, m. ________
NOZZLE DIAMETER, in. ________

TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	STATIC PRESSURE (P_s), in. Hg.	STACK TEMPERATURE (T_s), °F	VELOCITY HEAD (ΔP_s)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH), in. H_2O	GAS SAMPLE VOLUME (V_m), ft³	GAS SAMPLE TEMPERATURE AT DRY GAS METER		SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
							INLET ($T_{m_{in}}$), °F	OUTLET ($T_{m_{out}}$), °F		
TOTAL							Avg.	Avg.		
AVERAGE							Avg.			

Figure 102-6. Field data

4.6.4 To begin sampling, position the nozzle at the first traverse point with the tip pointing directly into the gas stream. Immediately start the pump and adjust the flow to isokinetic conditions. Sample for at least 5 minutes at each traverse point; sampling time must be the same for each point. Maintain isokinetic sampling throughout the sampling period, using the following procedures.

4.6.4.1 Nomographs which aid in the rapid adjustment of the sampling rate without other computations are in APTD-0576 and are available from commercial suppliers. The available nomographs, however, are set up for use in air streams, and minor changes are required to provide applicability to hydrogen.

4.6.4.2 Calibrate the meter box orifice. Use the techniques as described in APTD-0576.

4.6.4.3 The correction factor nomograph discussed in APTD-0576 and shown on the reverse side of commercial nomographs will not be used. In its place, the correction factor will be calculated using equation 102-2.

$$C=0.01\frac{(C_pM_s)^2}{\Delta H_{@}}\frac{P_s}{P_m}\frac{T_m}{M_s}$$

eq. 102-2

where:

C = Correction factor.
C_p = Pitot tube coefficient.
M_s = Mole fraction dry gas.
P_s = Stack pressure, inHg.
P_m = Meter pressure, inHg.
T_m = Meter temperature, °R.
M_s = Molecular weight of stack gas (from 4.4.4), lb/lb mole.
$\Delta H_{@}$ = Meter box calibration factor, obtained in step 4.6.4.2.

4.6.4.4 Set the calculated correction factor on the front of the operating nomograph. Select the proper nozzle and set the K-factor on the nomograph as detailed in APTD-0576.

4.6.4.5 Read the velocity head in the stack at each sample point from the manometer in the meter box. Convert the hydrogen ΔP to an equivalent value for air by multiplying by a ratio of the molecular weight of air to hydrogen at the stack moisture content. Insert this value of ΔP onto the nomograph and read off ΔH. Again, convert the ΔH, which is an air equivalent value, to the ΔH for hydrogen by dividing by 13. This factor includes the ratio of the dry molecular weights and a correction for the different orifice calibration factors for hydrogen and air. This procedure is diagrammed below:

Observe ΔP → Multiply by $\left(\frac{MW\ \text{air}}{MWH_2}\right)_{\text{wet}}$ → Set this on nomograph.

Read off ΔH → Divide by 13 = WH to be used on meter box.

4.6.4.6 Operate the sample train at the calculated ΔH at each sample point.

4.6.5 Turn off the pump at the conclusion of each run and record the final readings. Immediately remove the probe and nozzle from the stack and handle in accordance with the sample recovery process described in section 4.7.

4.7 Sample recovery.

4.7.1 (All glass storage bottles and the graduated cylinder must be precleaned as in section 4.5.1). This operation should be performed in an area free of possible mercury contamination. Industrial laboratories and ambient air around mercury-using facilities are not normally free of mercury contamination. When the sampling train is moved, care must be exercised to prevent breakage and contamination.

4.7.2 Disconnect the probe from the impinger train. Place the contents (measured to ±1 ml) of the first three impingers into a 500 ml sample bottle. Rinse the probe and all glassware between it and the back half of the third impinger with two 50 ml portions of 0.1M ICl solution. Add these rinses to the first bottle. For a blank, place 50 ml of the 0.1M ICl in a 100 ml sample bottle. Place the silica gel in the plastic jar. Seal and secure all containers for shipment. If an additional test is desired, the glassware can be carefully double rinsed with distilled water and reassembled. However, if the glassware is to be out of use more than 2 days, the initial acid wash procedure must be followed.

4.8 *Analysis*—4.8.1 *Apparatus preparation.*—Clean all glassware according to the procedure of section 4.5.1. Adjust the instrument settings according to the instrument manual, using an absorption wavelength of 253.7 nm.

4.8.2 *Analysis preparation.*—Adjust the air delivery pressure and the needle valve to obtain a constant air flow of about 1.3 l/min. The analysis tube should be bypassed except during aeration. Purge the equipment for 2 minutes. Prepare a sample of mercury standard solution (3.4.2) according to section 4.8.3. Place the analysis tube in the line, and aerate until a maximum peak height is reached on the recorder. Remove the analysis tube, flush the lines, and rinse the analysis tube with distilled water. Repeat with another sample of the same standard solution. This purge and analysis cycle is to be repeated until peak heights are reproducible.

4.8.3 *Sample preparation.*—Just prior to analysis, transfer a sample aliquot of up to 50 ml to the cleaned 100 ml analysis tube. Adjust the volume to 50 ml with 0.1M ICl if required. Add 5 ml of 10 N sodium hydroxide, cap tube with a clean glass stopper and shake vigorously. Prolonged, vigorous shaking at this point is necessary to obtain an accurate analysis. Add 5 ml of the reducing agent (reagent 3.3.2), cap tube with a clean glass stopper and shake vigorously and immediately place in sample line.

4.8.4 *Mercury determination.*—After the system has been stabilized, prepare samples from the sample bottle according to section 4.8.3. Aerate the sample until a maximum peak height is reached on the recorder. The mercury content is determined by comparing the peak heights of the samples to the peak heights of the calibration solutions. If collected samples are out of the linear range, the samples should be diluted. Prepare a blank from the 100 ml bottle according to section 4.8.3 and analyze to determine the reagent blank mercury level.

5. *Calibration.*—5.1 *Sampling Train.* 5.1.1 Use standard methods and equipment as detailed in APTD-0576 to calibrate the rate meter, pitot tube and dry gas meter. Recalibrate prior to each test series.

5.2 *Analysis.*—5.2.1 Prepare a calibration curve for the spectrophotometer using the standard mercury solutions. Plot the peak heights read on the recorder versus the concentration of mercury in the standard solutions. Standards should be interspersed with the samples since the calibration can change slightly with time. A new calibration curve should be prepared for each new set of samples run.

6. *Calculations*—6.1 *Average dry gas meter temperature, stack temperature, stack pressure and average orifice pressure drop.*—See data sheet (fig. 102-6).

6.2 *Dry gas volume.*—Correct the sample volume measured by the dry gas meter to stack conditions by using equation 102-3.

$$V_{m_s}=V_m\frac{T_s}{T_m}\frac{\left(P_{bar}+\frac{\Delta H}{13.6}\right)}{P_s}$$

eq. 102-3

where

V_{m_s} = Volume of gas sample through the dry gas meter (stack conditions), ft³.
V_m = Volume of gas sample through the dry gas meter (meter conditions), ft³.
T_s = Average temperature of stack gas, °R.
T_m = Average dry gas meter temperature, °R.
P_{bar} = Barometric pressure at the orifice meter, inHg.
ΔH = Average pressure drop across the orifice meter, inH_2O.
13.6 = Specific gravity of mercury.
P_s = Stack pressure, P_{bar} ± static pressure, inHg.

6.3 *Volume of water vapor.*

$$V_{w_s} = K_w V_{l_c} \frac{T_s}{P_s} \qquad \text{eq. 102-4}$$

where:

V_{w_s} = Volume of water vapor in the gas sample (stack conditions), ft³.

K_w = 0.00267 $\frac{\text{in. Hg} - \text{ft}^3}{\text{ml.} - {}^\circ\text{R}}$, when these units are used.

V_{l_c} = Total volume of liquid collected in impingers and silica gel (see figure 102-7), ml.

T_s = Average stack gas temperature, °R.

P_s = Stack pressure, P_{bar} ± static pressure, in. Hg.

6.4 *Total gas volume.*

$$V_{total} = V_{m_s} + V_{w_s} \qquad \text{eq. 102-5}$$

where:

V_{total} = total volume of gas sample (stack conditions), ft³.

V_{m_s} = Volume of gas through dry gas meter (stack conditions), ft³.

V_{w_s} = Volume of water vapor in gas sample (stack conditions), ft³.

	VOLUME OF LIQUID WATER COLLECTED	
	IMPINGER VOLUME, ml	SILICA GEL WEIGHT, g
FINAL		
INITIAL		
LIQUID COLLECTED		
TOTAL VOLUME COLLECTED		g* ml

CONVERT WEIGHT OF WATER TO VOLUME BY dividing total weight INCREASE BY DENSITY OF WATER (1 g/ml)

$$\frac{\text{INCREASE, g}}{(1\ \text{g/ml})} = \text{VOLUME WATER, ml}$$

Figure 102-7. Analytical data.

6.5 *Stack gas velocity*—Use equation 102-6 to calculate the stack gas velocity.

$$(v_s)_{avg.} = K_p C_p (\sqrt{\Delta P})_{avg.} \sqrt{\frac{(T_s)_{avg.}}{P_s M_s}} \qquad \text{eq 102-6}$$

where:

$(v_s)_{avg.}$ = Average stack gas velocity, feet per second.

$K_p = 85.53 \frac{\text{ft}}{\text{sec}} \left(\frac{\text{lb-inHg}}{\text{lb mole}^\circ\text{-R-inH}_2\text{O}} \right)^{1/2}$, when these units are used.

C_p = Pitot tube coefficient, dimensionless.

$(T_s)_{avg.}$ = Average stack gas temperature, °R.

$(\sqrt{\Delta P})_{avg.}$ = Average square root of the velocity head of stack gas $(\text{inH}_2\text{O})^{1/2}$ (see figure 102-8).

P_s = Stack pressure, P_{bar} ± static pressure, in Hg.

M_s = Molecular weight of stack gas (wet basis), the summation of the products of the molecular weight of each component multiplied by its volumetric proportion in the mixture, lb/lb-mole.

Figure 102-8 shows a sample recording sheet for velocity traverse data. Use the averages in the last two columns of figure 102-8 to determine the average stack gas velocity from equation 102-6.

6.6 Mercury collected. Calculate the total weight of mercury collected by using eq. 102-7.

PLANT____________________

DATE____________________

RUN NO.____________________

STACK DIAMETER, In.____________________

BAROMETRIC PRESSURE, In. Hg.____________________

STATIC PRESSURE IN STACK (P_g), In. Hg.____________________

OPERATORS____________________

SCHEMATIC OF STACK CROSS SECTION

Traverse point number	Velocity head, in. H_2O	$\sqrt{\Delta_p}$	Stack Temperature (T_s), °F
	AVERAGE:		

Figure 102-8. Velocity traverse data.

$$W_t = V_t C_t - V_b C_b \ldots\ldots \text{eq. } 102\text{-}7$$

where:

W_t = Total weight of mercury collected, μg.

V_t = Total volume of condensed moisture and ICl in sample bottle, ml.

C_t = Concentration of mercury measured in sample bottle, μg/ml.

V_b = Total volume of ICl used in sampling (impinger contents and all wash amounts), ml.

C_b = Blank concentration of mercury in ICl solution, μg/ml.

6.7 *Total mercury emission.*—Calculate the total amount of mercury emitted from each stack per day by equation 102-8. This equation is applicable for continuous operations. For cyclic operations, use only the time per day each stack is in operation. The total mercury emissions from a source will be the summation of results from all stacks.

$$R = \frac{W_t (v_s)_{\text{avg.}} A_s}{V_{\text{total}}} \times \frac{86{,}400 \text{ seconds/day}}{10^6 \ \mu\text{g/g}}$$

eq. 102-8

where:

R = Rate of emission, g/day.

W_t = Total weight of mercury collected, μg.

V_{total} = Total volume of gas sample (stack conditions), ft^3.

$(v_s)_{\text{avg.}}$ = Average stack gas velocity, feet per second.

A_s = Stack area, ft^2.

6.8 *Isokinetic variation (comparison of velocity of gas in probe tip to stack velocity).*

$$I = \frac{100 V_{\text{total}}}{A_n \theta (v_s)_{\text{avg.}}} \qquad \text{eq. } 102\text{-}9$$

where:

I = Percent of isokinetic sampling.

V_{total} = Total volume of gas sample (stack conditions), ft^3.

A_n = Probe tip area, ft^2.

θ = Sampling time, sec.

$(v_s)_{\text{avg.}}$ = Average stack gas velocity, feet per second.

7. *Evaluation of results.*—7.1 Determination of compliance.—7.1.1 Each performance test shall consist of three repititions of the applicable test method. For the purpose of determining compliance with an applicable national emission standard, the average of results of all repetitions shall apply.

7.2 *Acceptable isokinetic results.*—7.2.1 The following range sets the limit on acceptable isokinetic sampling results: If $90\% \leq I \leq 110\%$, the results are acceptable; otherwise, reject the test and repeat.

8. *References.*—1. Addendum to Specifications for Incinerator Testing at Federal Facilities, PHS, NCAPC, Dec. 6, 1967.

2. Determining Dust Concentration in a Gas Stream, ASME Performance Test Code No. 27, New York, N.Y., 1957.

3. Devorkin, Howard, et al., Air Pollution Source Testing Manual, Air Pollution Control District, Los Angeles, Calif., Nov. 1963.

4. Hatch, W. R. and W. L. Ott, "Determination of Sub-Microgram Quantities of Mercury by Atomic Absorption Spectrophotometry," Anal. Chem., 40: 2085-87, 1968.

5. Mark, L. S., Mechanical Engineers' Handbook, McGraw-Hill Book Co., Inc., New York, N.Y., 1951.

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7. Methods for Determination of Velocity, Volume, Dust and Mist Content of Gases, Western Precipitation Division of Joy Manufacturing Co., Los Angeles, Calif. Bull. WP-50, 1968.

8. Perry, J. H., Chemical Engineers' Handbook, McGraw-Hill Book Co., Inc., New York, N.Y., 1960.

9. Rom, Jerome J., Maintenance, Calibration, and Operation of Isokinetic Source Sampling Equipment, Environmental Protection Agency, APTD-0576.

10. Shigehara, R. T., W. F. Todd, and W. S. Smith, Significance of Errors in Stack Sampling Measurements, Paper presented at the Annual Meeting of the Air Pollution Control Association, St. Louis, Mo., June 14-19, 1970.

11. Smith, W. S., et al., Stack Gas Sampling Improved and Simplified with New Equipment, APCA paper No. 67-119, 1967.

12. Smith, W. S., R. T. Shigehara, and W. F. Todd, A Method of Interpreting Stack Sampling Data, Paper presented at the 63d Annual Meeting of the Air Pollution Control Association, St. Louis, Mo., June 14-19, 1970.

13. Specifications for Incinerator Testing at Federal Facilities PHS, NCAPC, 1967.

14. Standard Method for Sampling Stacks for Particulate Matter, In: 1971 Book of ASTM Standards, part 23, Philadelphia, 1971, ASTM Designation D-2928-71.

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METHOD 103. BERYLLIUM SCREENING METHOD

1. *Principle and applicability.*—1.1 *Principle.*—Beryllium emissions are isokinetically sampled from three points in a duct or stack. The collected sample is analysed for beryllium using an appropriate technique.

1.2 *Applicability.*—This procedure details guidelines and requirements for methods acceptable for use in determining beryllium emissions in ducts or stacks at stationary sources, as specified under the provisions of § 61.14 of the regulations.

2. *Apparatus*—2.1 *Sampling train.*—A schematic of the required sampling train configuration is shown in figure 103-1. The essential components of the train are the following:

2.1.1 *Nozzle.*—Stainless steel, or equivalent, with sharp, tapered leading edge.

2.1.2 *Probe.*—Sheathed Pyrex[1] glass.

2.1.3 *Filter.*—Millipore AA, or equivalent, with appropriate filter holder that provides a positive seal against leakage from outside or around the filter. It is suggested that a Whatman 41, or equivalent, be placed immediately against the back side of the Millipore filter as a guard against breakage of the Millipore. Include the Whatman 41 in the analysis. Equivalent filters must be at least 99.95 percent efficient (DOP Test) and amenable to the analytical procedure.

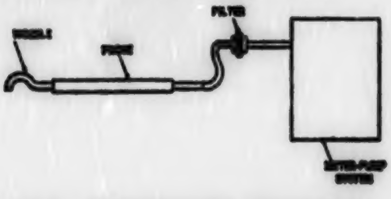

Figure 103-1. Beryllium screening method: sample train schematic.

2.1.4 *Meter-pump system.*—Any system that will maintain isokinetic sampling rate, determine sample volume, and is capable of a sampling rate of greater than 0.5 cfm.

2.2 *Measurement of stack conditions (stack pressure, temperature, moisture and velocity).*—The following equipment shall be used in the manner specified in section 4.3.1.

2.2.1 *Pitot tube.*—Type S, or equivalent, with a coefficient within 5 percent over the working range.

2.2.2 *Differential pressure gauge.*—Inclined manometer, or equivalent, to measure velocity head to within 10 percent of the minimum value.

2.2.3. *Temperature gauge.*—Any temperature measuring device to measure stack temperature to within 5° F.

2.2.4 *Pressure gauge.*—Any device to measure stack pressure to within 0.1 in. Hg.

2.2.5 *Barometer.*—To measure atmospheric pressure to within 0.1 in. Hg.

2.2.6 *Moisture determination.*—Wet and dry bulb thermometers, drying tubes, condensers, or equivalent, to determine stack gas moisture content to within 1 percent.

2.3 *Sample recovery.*—2.3.1 *Probe cleaning equipment.*—Probe brush or cleaning rod at least as long as probe, or equivalent. Clean cotton balls, or equivalent, should be used with the rod.

2.3.2 *Leakless glass sample bottles.*

2.4 *Analysis.*—2.4.1 Equipment necessary to perform an atomic absorption, spectrographic, fluorometric, chromatographic, or equivalent analysis.

3. *Reagents.*—3.1 *Sample recovery.*—3.1.1 *Acetone.*—Reagent grade.

3.1.2 *Wash acid.*—1:1 V/V hydrochloric acid-water.

3.2 *Analysis.*—3.2.1 Reagents as necessary for the selected analytical procedure.

4. *Procedure.*—4.1 Guidelines for source testing are detailed in the following sections. These guidelines are generally applicable; however, most sample sites differ to some degree and temporary alterations such as stack extensions or expansions often are required to insure the best possible sample site. Further, since beryllium is hazardous, care should be taken to minimize exposure. Finally, since the total quantity of beryllium to be collected is quite small, the test must be carefully conducted to prevent contamination or loss of sample.

4.2 *Selection of a sampling site and number of runs.*—4.2.1 Select a suitable sampling site that is as close as practicable to the point of atmospheric emission. If possible, stacks smaller than 1 foot in diameter should not be sampled.

4.2.2 The sampling site should be at least eight stack or duct diameters downstream and two diameters upstream from any flow disturbance such as a bend, expansion or contraction. For rectangular cross-section, determine an equivalent diameter using the following equation:

$$D_e = \frac{2LW}{L+W} \text{-----------------------} \quad \text{eq. 103-1}$$

where:

D_e = equivalent diameter
L = length
W = width

4.2.3 Some sampling situations may render the above sampling site criteria impractical. When this is the case, an alternate site may be selected but must be no less than two diameters downstream and one-half diameter upstream from any point of disturbance. Additional sample runs are recommended at any sample site not meeting the criteria of section 4.2.2.

4.2.4 Three runs shall constitute a test. The runs shall be conducted at three different points. The three points shall proportionately divide the diameter, *i.e.* be located at 25, 50 and 75 percent of the diameter from the inside wall. For horizontal ducts, the diameter shall be in the vertical direction. For rectangular ducts, sample on a line through the centroid and parallel to a side. If additional runs are required per section 4.2.3, proportionately divide the duct to accommodate the total number of runs.

4.3 *Measurement of stack conditions.* 4.3.1 Measure the stack gas pressure, moisture, and temperature, using the equipment described in § 2.2. Determine the molecular weight of the stack gas. Sound engineering estimates may be made in lieu of direct measurements. The basis for such estimates shall be given in the test report.

4.4 *Preparation of sampling train.*—4.4.1 Assemble the sampling train as shown in figure 103-1. It is recommended that all glassware be precleaned by soaking in wash acid for 2 hours.

4.4.2 Leak check the sampling train at the sampling site. The leakage rate should not be in excess of 1 percent of the desired sample rate.

4.5 *Beryllium train operation.*—4.5.1 For each run, measure the velocity at the selected sampling point. Determine the isokinetic sampling rate. Record the velocity head and the required sampling rate.

4.5.2 Place the nozzle at the sampling point with the tip pointing directly into the gas stream. Immediately start the pump and adjust the flow to isokinetic conditions. At the conclusion of the test, record the sampling rate. Again measure the velocity head at the sampling point. The required isokinetic rate at the end of the period should not have deviated more than 20 percent from that originally calculated.

4.5.3 Sample at a minimum rate of 0.5 ft³/min. Samples shall be taken over such a period or periods as are necessary to determine the maximum emissions which would occur in a 24-hour period. In the case of cyclic operations, sufficient tests shall be made so as to allow determination or calculation of the emissions which would occur over the duration of the cycle. A minimum sampling time of 2 hours is recommended.

4.5.4 All pertinent data should be included in the test report.

4.6 *Sample recovery.*—4.6.1 It is recommended that all glassware be precleaned as in § 4.4.1. Sample recovery should also be performed in an area free of possible beryllium contamination. When the sampling train is moved, exercise care to prevent breakage and contamination. Set aside a portion of the acetone used in the sample recovery as a blank for analysis. The total amount of acetone used should be measured for accurate blank correction. Blanks can be eliminated if prior analysis shows negligible amounts.

4.6.2 Remove the filter and any loose particulate matter from filter holder and place in a container.

4.6.3 Clean the probe with acetone and a brush or long rod and cotton balls. Wash into the container. Wash out the filter holder with acetone and add to the same container.

4.7 *Analysis.*—4.7.1 Make the necessary preparation of samples and analyze for beryllium. Any currently acceptable method such as atomic absorption, spectrographic, fluorometric, chromatographic, or equivalent may be used.

5. *Calibration and standards*—5.1 *Sampling train.*—5.1.1 As a procedural check, sampling rate regulation should be compared with a dry gas meter, spirometer, rotameter (calibrated for prevailing atmospheric conditions), or equivalent, attached to nozzle inlet of the complete sampling train.

5.1.2 Data from this test and calculations should be shown in test report.

5.2 *Analysis.*—5.2.1 Standardization is made as suggested by the manufacturer of the instrument or the procedures for the analytical method.

6. *Calculations*—6.1 *Total beryllium emission.* Calculate the total amount of beryllium emitted from each stack per day by equation 103-2. This equation is applicable for continuous operations. For cyclic operations, use only the time per day each stack is in operation. The total beryllium emissions from a source will be the summation of results from all stacks.

$$R = \frac{W_t (v_s)_{avg} A_s}{V_{total}} \times \frac{86{,}400 \text{ seconds/day}}{10^6 \mu g/g}$$

where:

R = Rate of emission, g/day.
W_t = Total weight of beryllium collected, μg.
V_{total} = Total volume of gas sampled, ft³.
$(v_s)_{avg}$ = Average stack gas velocity, feet per second.
A_s = Stack area, ft².

7. *Test report.* 7.1 A test report shall be prepared which shall include as a minimum:

7.1.1 A detailed description of the sampling train used and results of the procedural check with all data and calculations made.

7.1.2 All pertinent data taken during test, the basis for any estimates made, calculations, and results.

7.1.3 A description of the test site, including a block diagram with a brief description of the process, location of the sample points in the cross section, dimensions and distances from any point of disturbance.

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[1] Mention of trade names or specific products does not constitute endorsement by the Environmental Protection Agency.

METHOD 104. REFERENCE METHOD FOR DETERMINATION OF BERYLLIUM EMISSIONS FROM STATIONARY SOURCES

1. *Principle and applicability*—1.1 *Principle.*—Beryllium emissions are isokinetically sampled from the source, and the collected sample is digested in an acid solution and analyzed by atomic absorption spectrophotometry.

1.2 *Applicability.*—This method is applicable for the determination of beryllium emissions in ducts or stacks at stationary sources. Unless otherwise specified, this method is not intended to apply to gas streams other than those emitted directly to the atmosphere without further processing.

2. *Apparatus*—2.1 *Sampling train.*—A schematic of the sampling train used by EPA is shown in figure 104–1. Commercial models of this train are available, although construction details are described in APTD-0581,[1] and operating and maintenance procedures are described in APTD-0576. The components essential to this sampling train are the following:

2.1.1 *Nozzle.*—Stainless steel or glass with sharp, tapered leading edge.

2.1.2 *Probe.*—Sheathed Pyrex[2] glass. A heating system capable of maintaining a minimum gas temperature in the range of the stack temperature at the probe outlet during sampling may be used to prevent condensation from occurring.

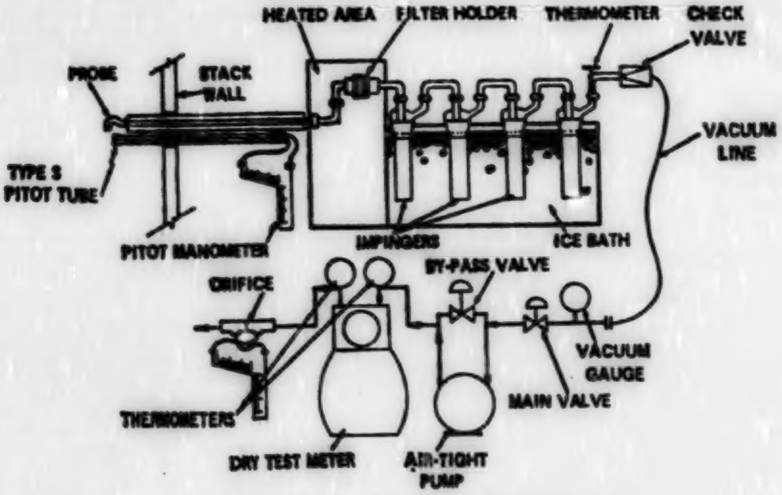

Figure 104-1. Beryllium sampling train

2.1.3 *Pitot tube.*—Type S (figure 104–2), or equivalent, with a coefficient within 5 percent over the working range, attached to probe to monitor stack gas velocity.

2.1.4 *Filter holder.*—Pyrex glass. The filter holder must provide a positive seal against leakage from outside or around the filter. A heating system capable of maintaining the filter at a minimum temperature in the range of the stack temperature may be used to prevent condensation from occurring.

2.1.5 *Impingers.*—Four Greenburg-Smith impingers connected in series with glass ball joint fittings. The first, third, and fourth impingers may be modified by replacing the tip with a ½-inch i.d. glass tube extending to one-half inch from the bottom of the flask.

2.1.6 *Metering system.*—Vacuum gauge, leakless pump, thermometers capable of measuring temperature to within 5° F, dry gas meter with 2 percent accuracy, and related equipment, described in APTD-0581, to maintain an isokinetic sampling rate and to determine sample volume.

2.1.7 *Barometer.*—To measure atmospheric pressure to ± 0.1 in Hg.

2.2 *Measurement of stack conditions (stack pressure, temperature, moisture and velocity)*—2.2.1 *Pitot tube.*—Type S, or equivalent, with a coefficient within 5 percent over the working range.

2.2.2 *Differential pressure gauge.*—Inclined manometer, or equivalent, to measure velocity head to within 10 percent of the minimum value.

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[1] These documents are available for a nominal cost from the National Technical Information Service, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Va. 22151.

[2] Mention of trade names on specific products does not constitute endorsement by the Environmental Protection Agency.

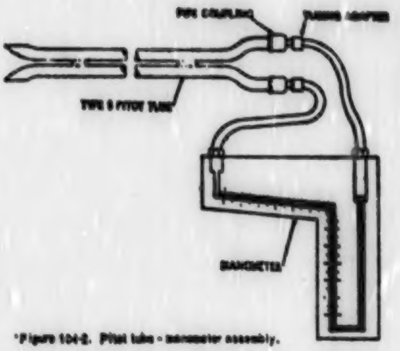

*Figure 104-2. Pitot tube - manometer assembly.

2.2.3 *Temperature gage.*—Any temperature measuring device to measure stack temperature to within 5° F.

2.2.4 *Pressure gage.*—Pitot tube and inclined manometer, or equivalent, to measure stack pressure to within 0.1 in Hg.

2.2.5 *Moisture determination.*—Wet and dry bulb thermometers, drying tubes, condensers, or equivalent, to determine stack gas moisture content to within 1 percent.

2.3 *Sample recovery*—2.3.1 *Probe cleaning rod.*—At least as long as probe.

2.3.2 *Leakless glass sample bottles.*—500 ml.

2.3.3 *Graduated cylinder.*—250 ml.

2.3.4 *Plastic jar.*—Approximately 300 ml.

2.4 *Analysis*—2.4.1 *Atomic absorption spectrophotometer.*—To measure absorbance at 234.8 nm. Perkin Elmer Model 303, or equivalent, with N_2O/acetylene burner.

2.4.2 *Hot plate.*

2.4.3 *Perchloric acid fume hood.*

3. *Reagents*—3.1 *Stock reagents.*—3.1.1 *Hydrochloric acid.*—Concentrated.

3.1.2 *Perchloric acid.*—Concentrated, 70 percent.

3.1.3 *Nitric acid.*—Concentrated.

3.1.4 *Sulfuric acid.*—Concentrated.

3.1.5 *Distilled and deionized water.*

3.1.6 *Beryllium powder.*—98 percent minimum purity.

3.2 *Sampling*—3.2.1 *Filter.* — Millipore AA, or equivalent. It is suggested that a Whatman 41 filter be placed immediately against the back side of the Millipore filter as a guard against breaking the Millipore filter. In the analysis of the filter, the Whatman 41 filter should be included with the Millipore filter.

3.2.2 *Silica gel.*—Indicating type, 6 to 16 mesh, dried at 350° F for 2 hours.

3.2.3 *Distilled and deionized water.*

3.3 *Sample recovery*—3.3.1 *Distilled and deionized water.*

3.3.2 *Acetone.*—Reagent grade.

3.3.3 *Wash acid.*—1:1 V/V hydrochloric acid-water.

3.4 *Analysis.*—3.4.1 *Sulfuric acid solution, 12 N.*—Dilute 333 ml of concentrated sulfuric acid to 1 l with distilled water.

3.4.2 *25 percent V/V hydrochloric acid-water.*

3.5 *Standard beryllium solution*—3.5.1 *stock solution.*—1 μg/ml beryllium. Dissolve 10 mg of beryllium in 80 ml of 12 N sulfuric acid solution and dilute to a volume of 1000 ml with distilled water. Dilute a 10 ml aliquot to 100 ml with 25 percent V/V hydrochloric acid, giving a concentration of 1 μg/ml. This dilute stock solution should be prepared fresh daily. Equivalent strength (in beryllium) stock solutions may be prepared from beryllium salts as $BeCl_2$ and $Be(NO_3)_2$ (98 percent minimum purity).

4. *Procedure.* 4.1 Guidelines for source testing are detailed in the following sections. These guidelines are generally applicable; however, most sample sites differ to some degree and temporary alterations such as stack extensions or expansions often are required to insure the best possible sample site. Further, since beryllium is hazardous, care should be taken to minimize exposure. Finally, since the total quantity of beryllium to be collected is quite small, the test must be carefully conducted to prevent contamination or loss of sample.

4.2 Selection of a sampling site and minimum number of traverse points.

4.2.1 Select a suitable sampling site that is as close as practicable to the point of atmospheric emission. If possible, stacks smaller than 1 foot in diameter should not be sampled.

4.2.2 The sampling site should be at least 8 stack or duct diameters downstream and 2 diameters upstream from any flow disturbance such as a bend, expansion or contraction. For a rectangular cross-section, determine an equivalent diameter from the following equation:

$$D_e=\frac{2LW}{L+W} \qquad \text{eq. 104-1}$$

where:

D_e = equivalent diameter
L = length
W = width

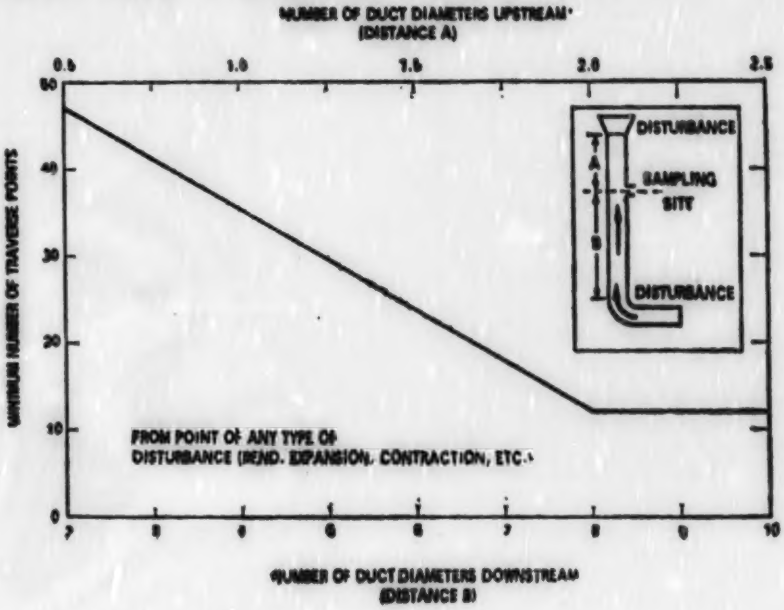

Figure 101-3. Minimum number of traverse points.

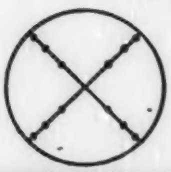

Figure 104-4. Cross section of circular stack showing location of traverse points on perpendicular diameters.

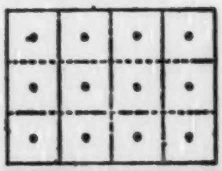

Figure 104-5. Cross section of rectangular stack divided into 12 equal areas, with traverse points at centroid of each area.

4.2.3 When the above sampling site criteria can be met, the minimum number of traverse points is four (4) for stacks 1 foot in diameter or less, eight (8) for stacks larger than 1 foot but 2 feet in diameter or less, and twelve (12) for stacks larger than 2 feet.

4.2.4 Some sampling situations may render the above sampling site criteria impractical. When this is the case, choose a convenient sampling location and use figure 104-3 to determine the minimum number of traverse points. However, use figure 104-3 only for stacks 1 foot in diameter or larger.

4.2.5 To use figure 104-3, first measure the distance from the chosen sampling location to the nearest upstream and downstream disturbances. Divide this distance by the diameter or equivalent diameter to determine the distance in terms of pipe diameters. Determine the corresponding number of traverse points for each distance from figure 104-3. Select the higher of the two numbers of traverse points, or a greater value, such that for circular stacks the number is a multiple of four, and for rectangular stacks the number follows the criteria of section 4.2.3.

4.2.6 If a selected sampling point is closer than 1 inch from the stack wall, adjust the location of that point to ensure that the sample is taken at least 1 inch away from the wall.

4.3 Cross-sectional layout and location of traverse points.

Table 104-1. Location of traverse points in circular stacks
(Percent of stack diameter from inside wall to traverse point)

Traverse point number on a diameter	Number of traverse points on a diameter											
	2	4	6	8	10	12	14	16	18	20	22	24
1	14.6	6.7	4.4	3.3	2.5	2.1	1.8	1.6	1.4	1.3	1.1	1.1
2	85.4	25.0	14.7	10.5	8.2	6.7	5.7	4.9	4.4	3.9	3.5	3.2
3		75.0	29.5	19.4	14.6	11.8	9.9	8.5	7.5	6.7	6.0	5.5
4		93.3	70.5	32.3	22.6	17.7	14.6	12.5	10.9	9.7	8.7	7.9
5			85.3	67.7	34.2	25.0	20.1	16.9	14.6	12.9	11.6	10.5
6			95.6	80.6	65.8	35.5	26.9	22.0	18.8	16.5	14.6	13.2
7				89.5	77.4	64.5	36.6	28.3	23.6	20.4	18.0	16.1
8				96.7	85.4	75.0	63.4	37.5	29.6	25.0	21.8	19.4
9					91.8	82.3	73.1	62.5	38.2	30.6	26.1	23.0
10					97.5	88.2	79.9	71.7	61.8	38.8	31.5	27.2
11						93.3	85.4	78.0	70.4	61.2	39.3	32.3
12						97.9	90.1	83.1	76.4	69.4	60.7	39.8
13							94.3	87.5	81.2	75.0	68.5	60.2
14							98.2	91.5	85.4	79.6	73.9	67.7
15								95.1	89.1	83.5	78.2	72.8
16								98.4	92.5	87.1	82.0	77.0
17									95.6	90.3	85.4	80.6
18									98.6	93.3	88.4	83.9
19										96.1	91.3	86.8
20										98.7	94.0	89.5
21											96.5	92.1
22											98.9	94.5
23												96.8
24												98.9

4.3.1 For circular stacks locate the traverse points on at least two diameters according to figure 104-4 and table 104-1. The traverse axes shall divide the stack cross section into equal parts.

4.3.2 For rectangular stacks divide the cross section into as many equal rectangular areas as traverse points, such that the ratio of the length to the width of the elemental areas is between 1 and 2. Locate the traverse points at the centroid of each equal area according to figure 104-5.

4.4 *Measurement of stack conditions.*—4.4.1 Set up the apparatus as shown in figure 104-2. Make sure all connections are tight and leak free. Measure the velocity head and temperature at the traverse points specified by §§ 4.2 and 4.3.

4.4.2 Measure the static pressure in the stack.

4.4.3 Determine the stack gas moisture.

4.4.4 Determine the stack gas molecular weight from the measured moisture content and knowledge of the expected gas stream composition. A standard Orsat analyzer has been found valuable at combustion sources. In all cases, sound engineering judgment should be used.

4.5 *Preparation of sampling train.*—4.5.1 Prior to assembly, clean all glassware (probe, impingers, and connectors) by soaking in wash acid for 2 hours. Place 100 ml of distilled water in each of the first two impringers, leave the third impinger empty, and place approximately 200 g of preweighted silica gel in the fourth impinger. Save a portion of the distilled water as a blank in the sample analysis. Set up the train and the probe as in figure 104-1.

4.5.2 Leak check the sampling train at the sampling site. The leakage rate should not be in excess of 1 percent of the desired sampling rate. If condensation in the probe or filter is a problem, probe and filter heaters will be required. Adjust the heaters to provide a temperature at or above the stack temperature. However, membrane filters such as the Millipore AA are limited to about 225° F. If the stack gas is in excess of about 200° F., consideration should be given to an alternate procedure such as moving the filter holder downstream of the first impinger to insure that the filter does not exceed its temperature limit. Place crushed ice around the impingers. Add more ice during the test to keep the temperature of the gases leaving the last impinger at 70° F. or less.

4.6 *Beryllium train operation.*—4.6.1 For each run, record the data required on the example sheet shown in figure 104-6. Take readings at each sampling point at least every 5 minutes and when significant changes in stack conditions necessitate additional adjustments in flow rate.

4.6.2 Sample at a rate of 0.5 to 1.0 $ft.^3$/min. Samples shall be taken over such a period or periods as are necessary to accurately determine the maximum emissions which would occur in a 24-hour period. In the case of cyclic operations, sufficient tests shall be made so as to allow accurate determination or calculation of the emissions which will occur over the duration of the cycle. A minimum sample time of 2 hours is recommended.

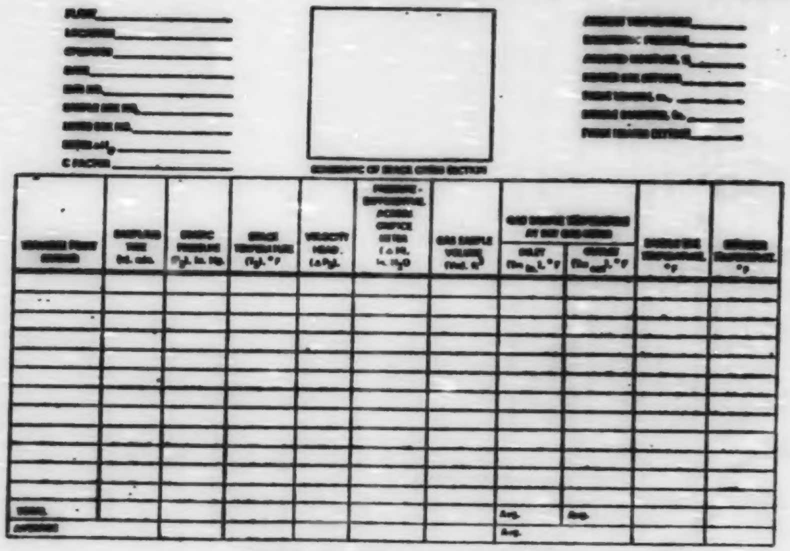

Figure 104-6. Field data

4.6.3 To begin sampling, position the nozzle at the first traverse point with the tip pointing directly into the gas stream. Immediately start the pump and adjust the flow to isokinetic conditions. Sample for at least 5 minutes at each traverse point; sampling time must be the same for each point. Maintain isokinetic sampling throughout the sampling period. Nomographs which aid in the rapid adjustment of the sampling rate without other computations are in APTD-0576 and are available from commercial suppliers. Note that standard monographs are applicable only for type S pitot tubes and air or a stack gas with an equivalent density. Contact EPA or the sampling train supplier for instructions when the standard monograph is not applicable.

4.6.4 Turn off the pump at the conclusion of each run and record the final readings. Immediately remove the probe and nozzle from the stack and handle in accordance with the sample recovery process described in § 4.7.

4.7 *Sample recovery.*—4.7.1 (All glass storage bottles and the graduated cylinder must be precleaned as in § 4.5.1.) This operation should be performed in an area free of possible beryllium contamination. When the sampling train is moved, care must be exercised to prevent breakage and contamination.

4.7.2 Disconnect the probe from the impinger train. Remove the filter and any loose particulate matter from the filter holder and place in a sample bottle. Place the contents (measured to ±1 ml) of the first three impingers into another sample bottle. Rinse the probe and all glassware between it and the back half of the third impinger with water and acetone, and add this to the latter sample bottle. Clean the probe with a brush or a long slender rod and cotton balls. Use acetone while cleaning. Add these to the sample bottle. Retain a sample of the water and acetone as a blank. The total amount of wash water and acetone used should be measured for accurate blank correction. Place the silica gel in the plastic jar. Seal and secure all sample containers for shipment. If an additional test is desired, the glassware can be carefully double rinsed with distilled water and reassembled. However, if the glassware is to be out of use more than 2 days, the initial acid wash procedure must be followed.

4.8. Analysis.

4.8.1 *Apparatus preparation.*—Clean all glassware according to the procedure of section 4.5.1. Adjust the instrument settings according to the instrument manual, using an absorption wavelength of 234.8 nm.

4.8.2 *Sample preparation.*—The digestion of beryllium samples is accomplished in part in concentrated perchloric acid. *Caution:* The analyst must insure that the sample is heated to light brown fumes after the initial nitric acid addition; otherwise, dangerous perchlorates may result from the subsequent perchloric acid digestion. Perchloric acid also should be used only under a perchloric acid hood.

4.8.2.1 Transfer the filter and any loose particulate matter from the sample container to a 150 ml beaker. Add 35 ml concentrated nitric acid. Heat on a hotplate until light brown fumes are evident to destroy all organic matter. Cool to room temperature and add 5 ml concentrated sulfuric acid and 5 ml concentrated perchloric acid. Then proceed with step 4.8.2.4.

4.8.2.2 Place a portion of the water and acetone sample into a 150 ml beaker and put on a hotplate. Add portions of the remainder as evaporation proceeds and evaporate to dryness. Cool the residue and add 35 ml concentrated nitric acid. Heat on a hotplate until light brown fumes are evident to destroy any organic matter. Cool to room temperature and add 5 ml concentrated sulfuric acid, and 5 ml concentrated perchloric acid. Then proceed with step 4.8.2.4.

4.8.2.3 Weigh the spent silica gel and report to the nearest gram.

4.8.2.4 Samples from 4.8.2.1 and 4.8.2.2 may be combined here for ease of analysis. Replace on a hotplate and evaporate to dryness in a perchloric acid hood. Cool and dissolve the residue in 10.0 ml of 25 percent V/V hydrochloric acid. Samples are now ready for the atomic absorption unit. The beryllium concentration of the sample must be within the calibration range of the unit. If necessary, further dilution of sample with 25 percent V/V hydrochloric acid must be performed to bring the sample within the calibration range.

4.8.3 *Beryllium determination.*—Analyze the samples prepared in 4.8.2 at 234.8 nm using a nitrous oxide/acetylene flame. Aluminum, silicon and other elements can interfere with this method if present in large quantities. Standard methods are available, however, to effectively eliminate these interferences (see Reference 5).

5. *Calibration*—5.1 *Sampling train.*—5.1.1 Use standard methods and equipment as detailed in APTD-0576 to calibrate the rate meter, pitot tube, dry gas meter and probe heater (if used). Recalibrate prior to each test series.

5.2 *Analysis.*—5.2.1 Standardization is made with the procedure as suggested by the manufacturer with standard beryllium solution. Standard solutions will be prepared from the stock solution by dilution with 25 percent V/V hydrochloric acid. The linearity of working range should be established with a series of standard solutions. If collected samples are out of the linear range, the samples should be diluted. Standards should be interspersed with the samples since the calibration can change slightly with time.

6. *Calculations*—6.1 *Average dry gas meter temperature, stack temperature, stack pressure and average orifice pressure drop.*—See data sheet (figure 104-6).

6.2 *Dry gas volume.*—Correct the sample volume measured by the dry gas meter to stack conditions by using equation 104-2.

$$V_{m_s} = V_m \frac{T_s}{T_m} \frac{\left(P_{bar} + \frac{\Delta H}{13.6}\right)}{P_s} \qquad \text{eq. 104-2}$$

where:

V_{m_s} = Volume of gas sample through the dry gas meter (stack conditions), ft³.

V_m = Volume of gas sample through the dry gas meter (meter conditions), ft³.

T_s = Average temperature of stack gas, °R.

T_m = Average dry gas meter temperature, °R.

P_{bar} = Barometric pressure at the orifice meter, in Hg.

ΔH = Average pressure drop across the orifice meter, in H_2O.

13.6 = Specific gravity of mercury.

P_s = Stack pressure, P_{bar} ± static pressure, in Hg.

6.3 *Volume of water vapor.*

$$W_{w_s} = K_w V_{l_c} \frac{T_s}{P_s} \qquad \text{eq. 104-3}$$

where:

V_{w_s} = Volume of water vapor in the gas sample (stack conditions), ft³.

$K_w = 0.00267 \frac{\text{in Hg-ft}^3}{\text{ml-°R}}$, when these units are used.

V_{l_c} = Total volume of liquid collected in impingers and silica gel (see figure 104-7), ml.

T_s = Average stack gas temperature, °R.

P_s = Stack pressure, P_{bar} ± static pressure, in Hg.

6.4 *Total gas volume.*

$$V_{total} = V_{m_s} + V_{w_s} \qquad \text{eq. 104-4}$$

where:

V_{total} = Total volume of gas sample (stack conditions), ft³.

V_{m_s} = Volume of gas through dry gas meter (stack conditions), ft³.

V_{w_s} = Volume of water vapor in gas sample (stack conditions), ft³.

6.5 *Stack gas velocity.*

Use equation 104-5 to calculate the stack gas velocity.

$$(v_s)_{avg.} = K_p C_p (\sqrt{\Delta p})_{avg.} \sqrt{\frac{(T_s)_{avg.}}{P_s M_s}} \qquad \text{eq. 104-5}$$

where:

$(v_s)_{avg.}$ = Average stack gas velocity, feet per second.

$K_p = 85.48 \frac{\text{ft}}{\text{sec}} \left(\frac{\text{lb-inHg}}{\text{lb mole-°R-inH}_2\text{O}}\right)^{1/2}$, when these units are used.

C_p = Pitot tube coefficient, dimensionless.

$(T_s)_{avg.}$ = Average stack gas temperature, °R.

$(\sqrt{\Delta p})_{avg.}$ = Average square root of the velocity head of stack gas $(\text{inH}_2\text{O})^{1/2}$ (see figure 104-6).

P_s = Stack pressure, P_{bar} ± static pressure, in Hg.

M_s = Molecular weight of stack gas (wet basis), the summation of the products of the molecular weight of each component multiplied by its volumetric proportion in the mixture, lb/lb-mole.

	VOLUME OF LIQUID WATER COLLECTED		
	IMPINGER VOLUME, ml	SILICA GEL WEIGHT, g	
FINAL			
INITIAL			
LIQUID COLLECTED			
TOTAL VOLUME COLLECTED		g*	ml

*CONVERT WEIGHT OF WATER TO VOLUME BY dividing total weight INCREASE BY DENSITY OF WATER. (1 g/ml):

$$\frac{\text{INCREASE, g}}{(1\ \text{g/ml})} = \text{VOLUME WATER, ml}$$

Figure 104-7. Analytical data.

PLANT____________________

DATE____________________

RUN NO.____________________

STACK DIAMETER, in.____________________

BAROMETRIC PRESSURE, in. Hg.____________________

STATIC PRESSURE IN STACK (P_g), in. Hg.__________

OPERATORS____________________

SCHEMATIC OF STACK CROSS SECTION

Traverse point number	Velocity head, in. H_2O	$\sqrt{\Delta_p}$	Stack Temperature (T_s), °F
	AVERAGE:		

Figure 104-8. Velocity traverse data.

Figure 104-8 shows a sample recording sheet for velocity traverse data. Use the averages in the last two columns of figure 104-8 to determine the average stack gas velocity from equation 104-5.

6.6 *Beryllium collected.*—Calculate the total weight of beryllium collected by using equation 104-6.

$$W_t = V_t C_t - V_w C_w - V_a C_a \quad \text{eq. 104-6}$$

where:

W_t = Total weight of beryllium collected, µg.

V_t = Total volume of hydrochloric acid from step 4.8.2.4, ml.

C_t = Concentration of beryllium found in sample, µg/ml.

V_w = Total volume of water used in sampling (impinger contents plus all wash amounts), ml.

C_w = Blank concentration of beryllium in water, µg/ml.

V_a = Total volume of acetone used in sampling (all wash amounts), ml.

C_a = Blank concentration of beryllium in acetone, µg/ml.

6.7 *Total beryllium emissions.*—Calculate the total amount of beryllium emitted from each stack per day by equation 104-7. This equation is applicable for continuous operations. For cyclic operations, use only the time per day each stack is in operation. The total beryllium emissions from a source will be the summation of results from all stacks.

$$R = \frac{W_t (v_s)_{avg.} A_s}{V_{total}} \times \frac{86{,}400 \text{ seconds/day}}{10^6 \ \mu g/g} \quad \text{eq. 104-7}$$

where:

R = Rate of emission, g/day.

W_t = Total weight of beryllium collected, µg.

V_{total} = Total volume of gas sample (stack conditions), ft³.

$(v_s)_{avg.}$ = Average stack gas velocity, feet per second.

A_s = Stack area, ft².

6.8 *Isokinetic variation (comparison of velocity of gas in probe tip to stack velocity).*

$$I = \frac{100 V_{total}}{A_n \Theta (v_s)_{avg.}} \quad \text{eq. 104-8}$$

where:

I = Percent of isokinetic sampling.

V_{total} = Total volume of gas sample (stack conditions), ft³.

A_n = Probe tip area, ft².

Θ = Sampling time, sec.

$(v_s)_{avg.}$ = Average stack gas velocity, feet per second.

7. *Evaluation of results*—7.1 *Determination of compliance.*—7.1.1 Each performance test shall consist of three repetitions of the applicable test method. For the purpose of determining compliance with an applicable national emission standard, the average of results of all repetitions shall apply.

7.2 *Acceptable isokinetic results.*—7.2.1 The following range sets the limit on acceptable isokinetic sampling results:

If 90 percent ≤I≤110 percent, the results are acceptable; otherwise, reject the test and repeat.

7. *References.*—1. Addendum to Specifications for Incinerator Testing at Federal Facilities, PHS, NCAPC, December 6, 1967.

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10. Perry, J. H., Chemical Engineers' Handbook, McGraw-Hill Book Co., Inc., New York, N.Y., 1960.

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13. Smith, W. S. et al., Stack Gas Sampling Improved and Simplified with New Equipment, APCA Paper No. 67-119, 1967.

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16. Standard Method for Sampling Stacks for Particulate Matter, In: 1971 Book of ASTM standards, Part 23, Philadelphia, 1971, ASTM Designation D-2928-71.

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METHOD 105. METHOD FOR DETERMINATION OF MERCURY IN WASTEWATER TREATMENT PLANT SEWAGE SLUDGES

1. *Principle and applicability.* 1.1 Principle—A weighed portion of the sewage sludge sample is digested in aqua regia for 2 minutes at 95°C, followed by oxidation with potassium permanganate. Mercury in the digested sample is then measured by the conventional spectrophotometer cold vapor technique. An alternative digestion involving the use of an autoclave is described in paragraph 4.5.2 of this method.

1.2 Applicability—This method is applicable for the determination of total organic and inorganic mercury content in sewage sludges, soils, sediments, and bottom-type materials. The normal range of this method is 0.2 to 5 μg/g. The range may be extended above or below the normal range by increasing or decreasing sample size and through instrument and recorder control.

2. *Apparatus.* 2.1 Analysis—The conventional cold vapor technique(5) is used to analyze the sample.

2.1.1 Atomic Absorption Spectrophotometer[1]—Any atomic absorption unit having an open sample presentation area in which to mount the absorption cell is suitable. Instrument settings recommended by the particular manufacturer should be followed.

2.1.2 Mercury Hollow Cathode Lamp—Westinghouse WL-22847, argon filled, or equivalent.

2.1.3 Recorder—Any multirange, variable-speed recorder that is compatible with the UV detection system is suitable.

2.1.4 Absorption Cell—Standard spectrophotometer cells 10 cm long, having quartz end windows may be used. Suitable cells may be constructed from plexiglass tubing, 2.5 cm O.D. x 11.4 cm (ca. 1" O.D. x 4½"). The ends are ground perpendicular to the longitudinal axis, and quartz windows [2.5 cm diameter x 0.16 cm thickness (ca. 1" diameter x 1/16" thickness)] are cemented in place. Gas inlet and outlet ports [also of plexiglass but 0.6 cm O.D. (ca. ¼" O.D.)] are attached approximately 1.3 cm (½") from each end. The cell is strapped to a burner for support and aligned in the light beam to give the maximum transmittance. NOTE: Two 5.1 cm x 5.1 cm (ca. 2" x 2") cards with 2.5 cm (ca. 1") diameter holes may be placed over each end of the cell to assist in positioning the cell for maximum transmittance.

2.1.5 Air Pump—Any peristaltic pump capable of delivering 1 liter of air per minute may be used. A Masterflex pump with electronic speed control has been found to be satisfactory. (Regulated compressed air can be used in an open one-pass system.)

2.1.6 Flowmeter—Capable of measuring an air flow of 1 liter per minute.

2.1.7 Aeration Tubing—Tygon tubing is used for passage of the mercury vapor from the sample bottle to the absorption cell and return. Straight glass tubing terminating in a coarse porous frit is used for sparging air into the sample.

2.1.8 Drying Tube—15 cm long x 1.9 cm diameter (ca. 6" long x ¾" diameter) tube containing 20 grams of the desiccant magnesium perchlorate. The apparatus is assembled as shown in Figure 105-1. In place of the magnesium perchlorate drying tube, a small reading lamp with 60W bulb may be used to prevent condensation of moisture inside the cell. The lamp is positioned so as not to interfere with the measurement and to shine on the absorption cell maintaining the air temperature about 5°C above ambient.

3. *Reagents.* 3.1 Analysis.

3.1.1 Aqua Regia—Prepare immediately before use by carefully adding three volumes of concentrated HCl to one volume of concentrated HNO_3.

3.1.2 Sulfuric Acid, 0.5N—Dilute 14.0 ml of concentrated sulfuric acid to 1.0 liter.

3.1.3 Stannous Sulfate—Add 25 g stannous sulfate to 250 ml of 0.5N sulfuric acid. This mixture is a suspension and should be stirred continuously during use. Stannous chloride may be used in place of the stannous sulfate.

3.1.4 Sodium Chloride—Hydroxylamine Sulfate Solution—Dissolve 12 grams of sodium chloride and 12 grams of hydroxylamine sulfate in distilled water and dilute to 100 ml. Hydroxylamine hydrochloride may be used in place of the hydroxylamine sulfate.

3.1.5 Potassium Permanganate—5% solution, w/v. Dissolve 5 grams of potassium permanganate in 100 ml of distilled water.

3.1.6 Stock Mercury Solution—Dissolve 0.1354 grams of reagent grade mercuric chloride (Assay >95%) in 75 ml of distilled water. Add 10 ml of concentrated nitric acid and adjust the volume to 100.0 ml. 1 ml = 1 mg Hg.

3.1.7 Working Mercury Solution—Make successive dilutions of the stock mercury solution to obtain a working standard containing 0.1 μg per ml. This working standard and the dilutions of the stock mercury solution should be prepared fresh daily. Acidity of the working standard should be maintained at 0.15% nitric acid. This acid should be added to the flask as needed before the addition of the aliquot. Mercuric solutions should not be prepared in plastic containers.

4. *Procedures.* Samples for mercury analysis are subject to contamination from a variety of sources. Extreme care must be taken to prevent contamination. Certain interferences may occur during the analysis procedures. Extreme caution must be taken to avoid inhalation of mercury.

4.1 Sample Handling and Preservation.

4.1.1 Because of the extreme sensitivity of the analytical procedure and the omnipresence of mercury, care must be taken to avoid extraneous contamination. Sampling devices, sample containers, and reagents should be ascertained to be free of significant amounts of mercury; the sample should not be exposed to any condition in the laboratory that may result in contact or airborne mercury contamination. Sample containers to be used for collection and shipment of mercury samples should be properly cleaned before use. These should be rinsed with at least 20% v/v HNO_3 followed by distilled water.

4.1.2 While the sample may be analyzed without drying, it has been found to be more convenient to analyze a dry sample. Moisture may be driven off in a drying oven at a temperature of 60°C. No significant mercury losses have been observed by using this drying step. The dry sample should be pulverized and thoroughly mixed before the aliquot is weighed.

4.2 Interferences.

4.2.1 Interferences that may occur in sludge samples are sulfides, high copper, high chlorides, etc. A discussion of possible interferences and suggested preventative measures to be taken is given in Reference (6) (7).

4.2.2 Volatile materials which absorb at the 253.7 nm will cause a positive interference. In order to remove any interfering volatile materials, the dead air space in the BOD bottle should be purged with nitrogen before the addition of stannous sulfate.

4.3 Handling Sample Mercury Vapors After Analysis.

4.3.1 Because of the toxic nature of mercury vapor, precaution must be taken to avoid its inhalation. Therefore, a bypass should be included in the analysis system to either vent the mercury vapor into an exhaust hood or pass the vapor through some absorbing media, such as:

(a) equal volumes of 0.1N $KMnO_4$ and 10% H_2SO_4;

(b) 0.25% iodine in a 3% KI solution.

A specially treated charcoal that will absorb mercury vapor is also available from Barneby and Cheney, E. 8th Ave. and North Cassidy St., Columbus, Ohio 43219, Catalog No. 580-13 or No. 580-22.[2]

4.4 Calibration.

4.4.1 Transfer 0, 0.5, 1.0, 2.0, 5.0 and 10 ml aliquots of the working mercury solution containing 0 to 1.0 μg of mercury to a series of 300-ml BOD bottles. Add enough distilled water to each bottle to make a total volume of 10 ml. Add 5 ml of aqua regia and heat 2 minutes in a water bath at 95°C. Allow the sample to cool and add 50 ml distilled water and 15 ml of $KMnO_4$ solution to each bottle and return to the water bath for 30 minutes. Cool and add 6 ml of sodium chloride-hydroxylamine sulfate solution to reduce the excess permanganate. Add 50 ml of distilled water. Treating each bottle individually, add 5 ml of stannous sulfate solution and immediately attach the bottle to the aeration apparatus. At this point, the sample is allowed to stand quitely without manual agitation. The circulating pump, which has previously been adjusted to a rate of 1 liter per minute, is allowed to run continuously. The absorbance, as exhibited either on the spectrophotometer or the recorder, will increase and reach maximum within 30 seconds. As soon as the recorder pen levels off, approximately 1 minute, open the bypass valve and continue the aeration until the absorbance returns to its minimum value. Close the bypass valve, remove the fritted tubing from the BOD bottle and continue the aeration. Proceed with the standards and construct a standard curve by plotting peak height versus micrograms of mercury.

4.5 Analysis.

4.5.1 Weigh triplicate 0.2g ± 0.001 g portions of dry sample and place in bottom of a BOD bottle. Add 5 ml of distilled water and 5 ml of aqua regia. Heat 2 minutes in a water bath at 95°C. Cool and add 50 ml distilled water and 15 ml potassium permanganate solution to each sample bottle. Mix thoroughly and place in the water bath for 30 minutes at 95°C. Cool and add 6 ml of sodium chloride-hydroxylamine sulfate to reduce the excess permanganate. Add 55 ml of distilled water. Treating each bottle individually, add 5 ml of stannous sulfate and immediately attach the bottle to the aeration apparatus. With each sample, continue as described in paragraph 4.4.1 of this method.

4.5.2 An alternative digestion procedure using an autoclave may also be used. In this method 5 ml of concentrated H_2SO_4 and 2 ml of concentrated HNO_3 are added to the 0.2 grams of sample. 5 ml of saturated $KMnO_4$ solution are added and the bottle is covered with a piece of aluminum foil. The samples are autoclaved at 121°C and 2.1 kg/cm² (ca. 15 psig) for 15 minutes. Cool, make up to a volume of 100 ml with distilled water, and add 6 ml of sodium chloride-hydroxylamine sulfate solution to reduce the excess permanganate. Purge the dead air space and continue as described in paragraph 4.4.1 of this method.

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[1] Instruments designed specifically for the measurement of mercury using the cold vapor technique are commercially available and may be substituted for the atomic absorption spectrophotometer.

[2] Mention of trade names or specific products does not constitute endorsement by the Environmental Protection Agency.

5. *Calculation.* 5.1 Measure the peak height of the unknown from the chart and read the mercury value from the standard curve.

5.2 Calculate the mercury concentration in the sample by the formula:

$$\mu g\ Hg/gm = \frac{\mu g\ Hg \text{ in the aliquot}}{\text{wt. of the aliquot in g}}$$

5.3 Report mercury concentrations as follows: Below 0.1 µg/g; between 0.1 and 1 µg/g, to the nearest 0.01 µg/g; between 1 and 10 µg/g, to nearest 0.1 µg; above 10 µg/g, to nearest µg.

6. *Precision and accuracy.* 6.1 According to the provisional method in reference number 5, the following standard deviations on replicate sediment samples have been recorded at the indicated levels: 0.29 µg/g ± 0.02 and 0.82 µg/g ± 0.03. Recovery of mercury at these levels, added as methyl mercuric chloride, was 97 and 94%, respectively.

7. *References.*

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2. Salma, M. Private communication, EPA Cal/Nev Basin Office, Alameda, California.

3. Hatch, W. R., and Ott, W. L. "Determination of Sub-Microgram Quantities of Mercury by Atomic Absorption Spectrophotometry." Ana. Chem. *40*, 2085 (1968).

4. Bradenberger, H. and Bader, H. "The Determination of Nanogram Levels of Mercury in Solution by a Flameless Atomic Absorption Technique," Atomic Absorption Newsletter *6*, 101 (1967).

5. Analytical Quality Control Laboratory (AQCL), Environmental Protection Agency, Cincinnati, Ohio, "Mercury in Sediment (Cold Vapor Technique)," Provisional Method, April 1972.

6. Kopp, J. F., Longbottom, M. C. and Lobring, L. B. "Cold Vapor Method for Determining Mercury," Journal AWWA, 64, 1 (1972), pp. 20–25.

7. "Manual of Methods for Chemical Analysis of Water and Wastes," Environmental Protection Agency, EPA-625/2-74-003, pp. 118–138.

METHOD 106—DETERMINATION OF VINYL CHLORIDE FROM STATIONARY SOURCES

INTRODUCTION

Performance of this method should not be attempted by persons unfamiliar with the operation of a gas chromatograph, nor by those who are unfamiliar with source sampling, as there are many details that are beyond the scope of this presentation. Care must be exercised to prevent exposure of sampling personnel to vinyl chloride, a carcinogen.

1. Principle and Applicability.

1.1 An integrated bag sample of stack gas containing vinyl chloride (chloroethylene) is subjected to chromatographic analysis, using a flame ionization detector.

1.2 The method is applicable to the measurement of vinyl chloride in stack gases from ethylene dichloride, vinyl chloride and polyvinyl chloride manufacturing processes, except where the vinyl chloride is contained in particulate matter.

2. Range and Sensitivity.

The lower limit of detection will vary according to the chromatograph used. Values reported include 1×10^{-7} mg and 4×10^{-7} mg.

3. Interferences.

Acetaldehyde, which can occur in some vinyl chloride sources, will interfere with the vinyl chloride peak from the Chromosorb 102 column. See sections 4.3.2 and 6.4. If resolution of the vinyl chloride peak is still not satisfactory for a particular sample, then chromatograph parameters can be further altered with prior approval of the Administrator. If alteration of the chromatograph parameters fails to resolve the vinyl chloride peak, then supplemental confirmation of the vinyl chloride peak through an absolute analytical technique, such as mass spectroscopy, must be performed.

4. Apparatus.

4.1 Sampling (Figure 1).

4.1.1 Probe—Stainless steel, Pyrex glass, or Teflon tubing according to stack temperature, each equipped with a glass wool plug to remove particulate matter.

4.1.2 Sample line—Teflon, 6.4 mm outside diameter, of sufficient length to connect probe to bag. A new unused piece is employed for each series of bag samples that constitutes an emission test.

4.1.3 Male (2) and female (2) stainless steel quick-connects, with ball checks (one pair without) located as shown in Figure 1.

4.1.4 Tedlar bags, 100 liter capacity—To contain sample. Teflon bags are not acceptable. Aluminized Mylar bags may be used, provided that the samples are analyzed within 24 hours of collection.

4.1.5 Rigid leakproof containers for 4.1.4, with covering to protect contents from sunlight.

4.1.6 Needle valve—To adjust sample flow rate.

4.1.7 Pump—Leak-free. Minimum capacity 2 liters per minute.

4.1.8 Charcoal tube—To prevent admission of vinyl chloride to atmosphere in vicinity of samplers.

4.1.9 Flow meter—For observing sample flow rate; capable of measuring a flow range from 0.10 to 1.00 liter per minute.

4.1.10 Connecting tubing—Teflon, 6.4 mm outside diameter, to assemble sample train (Figure 1).

4.1.11 Pitot tube—Type S (or equivalent), attached to the probe so that the sampling flow rate can be regulated proportional to the stack gas velocity.

4.2 Sample recovery.

4.2.1 Tubing—Teflon, 6.4 mm outside diameter, to connect bag to gas chromatograph sample loop. A new unused piece is employed for each series of bag samples that constitutes an emission test, and is to be discarded upon conclusion of analysis of those bags.

4.3 Analysis.

4.3.1 Gas chromatograph—With flame ionization detector, potentiometric strip chart recorder and 1.0 to 5.0 ml heated sampling loop in automatic sample valve.

4.3.2 Chromatographic column—Stainless steel, 2.0 m × 3.2 mm, containing 80/100 mesh Chromosorb 102. A secondary colum of GE SF-96, 20% on 60/80 mesh AW Chromosorb P, stainless steel, 2.0 m × 3.2 mm, will be required if acetaldehyde is present. If used, the SF-96 column is placed after the Chromosorb 102 column. The combined columns should then be operated at 110°C.

4.3.3 Flow meters (2)—Rotameter type, 0 to 100 ml/min capacity, with flow control valves.

4.3.4 Gas regulators—For required gas cylinders.

4.3.5 Thermometer—Accurate to one degree centigrade, to measure temperature of heated sample loop at time of sample injection.

4.3.6 Barometer—Accurate to 5 mm Hg, to measure atmospheric pressure around gas chromatograph during sample analysis.

4.3.7 Pump—Leak-free. Minimum capacity 100 ml/min.

4.4 Calibration.

4.4.1 Tubing—Teflon, 6.4 mm outside diameter, separate pieces marked for each calibration concentration.

4.4.2 Tedlar bags—Sixteen-inch square size, separate bag marked for each calibration concentration.

4.4.3 Syringe—0.5 ml, gas tight.

4.4.4 Syringe—50µl, gas tight.

4.4.5 Flow meter—Rotameter type, 0 to 1000 ml/min, range accurate to ±1%, to meter nitrogen in preparation of standard gas mixtures.

4.4.6 Stop watch—Of known accuracy, to time gas flow in preparation of standard gas mixtures.

5. Reagents. It is necessary that all reagents be of chromatographic grade.

5.1 Analysis.

5.1.1 Helium gas or nitrogen gas—Zero grade, for chromatographic carrier gas.

5.1.2 Hydrogen gas—Zero grade.

5.1.3 Oxygen gas, or Air, as required by the detector—Zero grade.

5.2 Calibration.

5.2.1 Vinyl chloride, 99.9+%—For preparation of standard gas mixtures.

5.2.2 Calibration cylinders (3), optional—One each of 50, 10 and 5 ppm vinyl chloride in nitrogen with certified analysis. Analysis must be traceable to NBS (National Bureau of Standards) or to a gravimetrically calibrated vinyl chloride permeation tube.

5.2.3 Nitrogen gas—Zero grade, for preparation of standard gas mixtures.

6. Procedure.

6.1 Sampling. Assemble the sample train as in Figure 106-1. Perform a bag leak check according to Section 7.4. Observe that all connections between the bag and the probe are tight. Place the end of the probe at the centroid of the stack and start the pump with the needle valve adjusted to yield a flow of 0.5 lpm. After a period of time sufficient to purge the line several times has elapsed, connect the vacuum line to the bag and evacuate the bag until the rotameter indicates no flow. Then reposition the sample and vacuum lines and begin the actual sampling, keeping the rate proportional to the stack velocity. Direct the gas exiting the rotameter away from sampling personnel. At the end of the sample period, shut off the pump, disconnect the sample line from the bag, and disconnect the vacuum line from the bag container. Protect the bag container from sunlight.

6.2 Sample storage. Sample bags must be kept out of direct sunlight. When at all possible, analysis is to be performed within 24 hours of sample collection.

6.3 Sample recovery. With a piece of Teflon tubing identified for that bag, connect a bag inlet valve to the gas chromatograph sample valve. Switch the valve to withdraw gas from the bag through the sample loop. Plumb the equipment so the sample gas passes from the sample valve to the leak-free pump, and then to a charcoal tube, followed by a 0–100 ml/min rotameter with flow control valve.

6.4 Analysis. Set the column temperature to 100° C the detector temperature to 150° C, and the sample loop temperature to 70° C. When optimum hydrogen and oxygen flow rates have been determined verify and maintain these flow rates during all chromatograph operations. Using zero helium or nitrogen as the carrier gas, establish a flow rate in the range consistent with the manufacturer's requirements for satisfactory detector operation. A flow rate of approximately 40 ml/min should produce adequate separations. Observe the base line periodically and determine that the noise level has stabilized and that base line drift has ceased. Purge the sample loop for thirty seconds at the rate of 100 ml/min, then activate the sample valve. Record the injection time (the position of the pen on the chart at the time of sample injection), the sample number, the sample loop temperature, the column temperature, carrier gas flow rate, chart speed and the attenuator setting. Record the laboratory pressure. From the chart, select the peak having the retention time corresponding to vinyl chloride, as determined in Section 7.2. Measure the peak area, A_m, by use of H_m, of a disc integrator or a planimeter. Measure the peak height, H_m. Record A_m, H_m, and the retention time. Repeat the injection at least two times or until two consecutive vinyl chloride peaks do not vary in area more than 5%. The average value for these two areas will be used to compute the bag concentration. 30

Compare the ratio of H_m to A_m for the vinyl chloride sample with the same ratio for the standard peak which is closest in height. As a guideline, if these ratios differ by more than 10%, the vinyl chloride peak may not be pure (possibly acetaldehyde is present) and the secondary column should be employed (see Section 4.3.2).

6.5 Measure the ambient temperature and barometric pressure near the bag. (Assume the relative humidity to be 100 percent.) From a water saturation vapor pressure table, determine and record the water vapor content of the bag. 30

7. Calibration and Standards.

7.1 Preparation of vinyl chloride standard gas mixtures. Evacuate a sixteen-inch square Tedlar bag that has passed a leak check (described in Section 7.4) and meter in 5.0 liters of nitrogen. While the bag is filling, use the 0.5 ml syringe to inject 250µl of 99.9+% vinyl chloride through the wall of the bag. Upon withdrawing the syringe needle, immediately cover the resulting hole with a piece of adhesive tape. This gives a concentration of 50 ppm of vinyl chloride. In a like manner use the other syringe to prepare dilutions having 10 and 5 ppm vinyl chloride concentrations. Place each bag on a smooth surface and alternately depress opposite sides of the bag 50 times to further mix the gases.

7.2 Determination of vinyl chloride retention time. This section can be performed simultaneously with Section 7.3. Establish chromatograph conditions identical with those in Section 6.3, above. Set attenuator to X 1 position. Flush the sampling loop with zero helium or nitrogen and activate the sample valve. Record the injection time, the sample loop temperature, the column

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[1] Mention of trade names on specific products does not constitute endorsement by the Environmental Protection Agency.

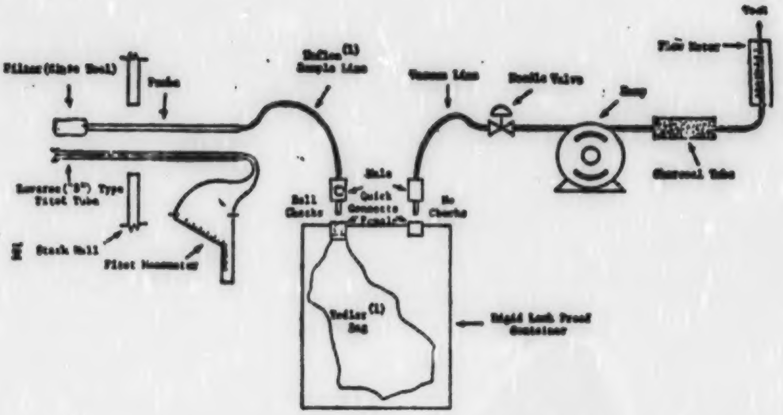

Figure 106-1. Integrated bag sampling train.

(1) Mention of trade names or specific products does not constitute endorsement by the Environmental Protection Agency.

temperature, the carrier gas flow rate, the chart speed and the attenuator setting. Record peaks and detector responses that occur in the absence of vinyl chloride. Maintain conditions. With the equipment plumbing arranged identically to Section 6.3, flush the sample loop for 30 seconds at the rate of 100 ml/min with one of the vinyl chloride calibration mixtures and activate the sample valve. Record the injection time. Select the peak that corresponds to vinyl chloride. Measure the distance on the chart from the injection time to the time at which the peak maximum occurs. This quantity, divided by the chart speed, is defined as the retention time. Record.

7.3 Preparation of chromatograph calibration curve. Make a gas chromatographic measurement of each standard gas mixture (described in Section 7.1) using conditions identical with those listed in Section 6.3 above. Flush the sampling loop for 30 seconds at the rate of 100 ml/min with each standard gas mixture and activate the sample valve. Record C_c, the concentrations of vinyl chloride injected, the attenuator setting, chart speed, peak area, sample loop temperature, column temperature, carrier gas flow rate, and retention time. Record the laboratory pressure. Calculate A_c, the peak area multiplied by the attenuator setting. Repeat until two injection areas are within 5%, then plot those points vs C_c. When the other concentrations have been plotted, draw a smooth curve through the points. Perform calibration daily, or before and after each set of bag samples, whichever is more frequent.

7.4 Bag leak checks. While performance of this section is required subsequent to bag use, it is also advised that it be performed prior to bag use. After each use, make sure a bag did not develop leaks as follows. To leak check, connect a water manometer and pressurize the bag to 5-10 cm H_2O (2-4 in H_2O). Allow to stand for 10 minutes. Any displacement in the water manometer indicates a leak. Also check the rigid container for leaks in this manner.

(NOTE: An alternative leak check method is to pressurize the bag to 5-10 cm H_2O or 2-4 in. H_2O and allow to stand overnight. A deflated bag indicates a leak.) For each sample bag in its rigid container, place a rotameter in-line between the bag and the pump inlet. Evacuate the bag. Failure of the rotameter to register zero flow when the bag appears to be empty indicates a leak.

8. Calculations.

8.1 Determine the sample peak area as follows:

$$A_c = A_m A_f$$

Equation 106-1

where:

A_c = The sample peak area.
A_m = The measured peak area.
A_f = The attenuation factor.

8.2 Vinyl chloride concentrations. From the calibration curve described in Section 7.3, above, select the value of C_c that corresponds to A_c, the sample peak area. Calculate C_b as follows:

$$C_b = \frac{C_c P_r T_i}{P_i T_r (1 - B_{wb})}$$

Equation 106-2

Where:

B_{wb} = The water vapor content of the bag sample, as analyzed.
C_b = The concentration of vinyl chloride in the bag sample in ppm.
C_c = The concentration of vinyl chloride indicated by the gas chromatograph, in ppm.
P_r = The reference pressure, the laboratory pressure recorded during calibration, mm Hg.
T_i = The sample loop temperature on the absolute scale at the time of analysis, °K.
P_i = The laboratory pressure at time of analysis, mm Hg.
T_r = The reference temperature, the sample loop temperature recorded during calibration, °K.

9. References.

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2. "Evaluation of A Collection and Analytical Procedure for Vinyl Chloride in Air," by G. D. Clayton and Associates, December 13, 1974. EPA Contract No. 68-02-1408, Task Order No. 2, EPA Report oN. 75-VCL-1.

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METHOD 107—DETERMINATION OF VINYL CHLORIDE CONTENT OF INPROCESS WASTEWATER SAMPLES, AND VINYL CHLORIDE CONTENT OF POLYVINYL CHLORIDE RESIN, SLURRY, WET CAKE, AND LATEX SAMPLES

INTRODUCTION

Performance of this method should not be attempted by persons unfamiliar with the operation of a gas chromatograph, nor by those who are unfamiliar with sampling, as there are many details that are beyond the scope of this presentation. Care must be exercised to prevent exposure of sampling personnel to vinyl chloride, a carcinogen.

1. Principle and Applicability.

1.1 The basis for this method relates to the vapor equilibrium which is established between RVCM, PVC, resin, water, and air in a closed system. It has been demonstrated that the RVCM in a PVC resin will equilibrate in a closed vessel quite rapidly, provided that the temperature of the PVC resin is maintained above the glass transition temperature of that specific resin.

1.2 This procedure is suitable for determining the vinyl chloride monomer (VCM) content of inprocess wastewater samples, and the residual vinyl chloride monomer (RVCM) content of polyvinyl chloride (PVC) resins, wet cake, slurry, and latex samples. It cannot be used for polymer in fused form, such as sheet or cubes. If a resolution of the vinyl chloride peak is not satisfactory for a particular sample, then chromatograph parameters may be altered with prior approval of the Administrator. If there is reason to believe that some other hydrocarbon with an identical retention time is present in the sample, then supplemental confirmation of the vinyl chloride peak through an absolute analytical technique, such as mass spectroscopy, should be performed.

2. Range and Sensitivity.

The lower limit of detection of vinyl chloride will vary according to the chromatograph used. Values reported include 1×10^{-7} mg and 4×10^{-7} mg. With proper calibration, the upper limit may be extended as needed.

3. Precision and Reproducibility.

An interlaboratory comparison between seven laboratories of three resin samples, each split into three parts, yielded a standard deviation of 2.63% for a sample with a mean of 2.09 ppm, 4.16% for a sample with a mean of 1.66 ppm, and 5.29% for a sample with a mean of 62.66 ppm.

4. Safety.

Do not release vinyl chloride to the laboratory atmosphere during preparation of standards. Venting or purging with VCM/air mixtures must be held to a minimum. When they are required, the vapor must be routed to outside air. Vinyl chloride, even at low ppm levels, must never be vented inside the laboratory. After vials have been analyzed, the pressure within the vial must be vented prior to removal from the instrument turntable. Vials must be vented into an activated charcoal tube using a hypodermic needle to prevent release of vinyl chloride into the laboratory atmosphere. The charcoal must be replaced prior to vinyl chloride breakthrough.

5. Apparatus.

5.1 Sampling.

5.1.1 Bottles—60 ml (2 oz), with waxed lined screw on tops, for PVC samples.

5.1.2 Vials—50 ml Hypo-vials,[1] sealed with Teflon faced Tuf-Bond discs for water samples.

5.1.3 Electrical tape—or equivalent, to prevent loosening of bottle tops.

5.2 Sample recovery.

5.2.1 Vials—With seals and caps, Perkin-Elmer Corporation No. 105-0118, or equivalent.

5.2.2 Analytical balance—Capable of weighing to ±0.001 gram.

5.2.3. Syringe, 100 μl—Precision Series "A" No. 010025, or equivalent.

5.2.4 Vial Sealer, Perkin-Elmer No. 105-0106 or equivalent.

5.3 Analysis.

5.3.1 Gas chromatograph—Perkin-Elmer Corporation Model F-40 head-space analyser, No. 104-0001, or equivalent.

5.3.2 Chromatographic column—Stainless steel, 2 m×3.2 mm, containing 0.4% Carbowax 1500 on Carbopak A, Perkin-Elmer Corporation No. 105-0133, or equivalent. Carbopak C can be used in place of Carbopak A.

5.3.3 Thermometer—0 to 100° C, accurate to ±0.1° C, Perkin-Elmer No. 105-0109 or equivalent.

5.3.4. Sample tray thermostat system—Perkin-Elmer No. 105-0103, or equivalent.

5.3.5 Septa—Sandwich type, for automatic dosing, 13 mm, Perkin-Elmer No. 105-1008, or equivalent.

5.3.6 Integrator - recorder — Hewlett - Packard Model 3380A, or equivalent.

5.3.7 Filter drier assembly (3)—Perkin-Elmer No. 2230117, or equivalent.

5.3.8 Soap film flowmeter—Hewlett Packard No. 0101-0113, or equivalent.

5.4 Calibration.

5.4.1 Regulators—for required gas cylinders.

6. Reagents.

6.1 Analysis.

6.1.1 Hydrogen gas—zero grade.

6.1.2 Nitrogen gas—zero grade.

6.1.3 Air—zero grade.

6.2 Calibration.

6.2.1 Standard cylinders (4)—one each of 50, 500, 2000, and 4000 ppm vinyl chloride in nitrogen, with certified analysis.

7. Procedure.

7.1 Sampling.

7.1.1 PVC sampling—Allow the resin or slurry to flow from a tap on the tank or silo until the tap line has been well purged. Extend a 60 ml sample bottle under the tap, fill, and immediately tightly cap the bottle. Wrap electrical tape around the cap and bottle to prevent the top from loosening. Place an identifying label on each bottle, and record the date, time, and sample location both on the bottles and in a log book.

7.1.2 Water sampling—Prior to use, the 50 ml vials (without the discs) must be capped with aluminum foil and muffled at 400°C for at least one hour to destroy or remove any organic matter that could interfere with analysis. At the sampling location fill the vials bubble-free, to overflowing so that a convex meniscus forms at the top. The excess water is displaced as the sealing disc is carefully placed, Teflon side down, on the opening of the vial. Place the aluminum seal over the disc and the neck of the vial and crimp into place. Affix an identifying label on the bottle, and record the date, time, and sample location both on the vials and in a log book. All samples must be kept refrigerated until analyzed.

7.2 Sample recovery. Samples must be run within 24 hours.

7.2.1 Resin samples—The weight of the resin used must be between 0.1 and 4.5 grams. An exact weight must be obtained (±0.001 gram) for each sample. In the case of suspension resins a volumetric cup can be prepared which will hold the required amount of sample. The sample bottle is opened, and the cup volume of resin is added to the tared sample vial (including septum and aluminum cap). The vial is immediately sealed and the exact sample weight is then obtained. Report this value on the data sheet as it is required for calculation of RVCM. In the case of relatively dry resin samples (water content <0.3 weight %), 100 μl of distilled water must be injected into the vial, after sealing and weighing, using a 100 μl syringe. In the case of dispersion resins, the cup cannot be used. The sample is instead weighed approximately in an aluminum dish, transferred to the tared vial and weighed accurately in the vial. The sample is then placed in the Perkin-Elmer head space analyser (or equivalent) and conditioned for one hour at 90°C.

NOTE: Some aluminum vial caps have a center section which must be removed prior to placing into sample tray. If not removed, serious damage to the injection needle will occur.

7.2.2 Suspension resin slurry and wet cake samples—Slurry must be filtered using a small Buchner funnel with vacuum to yield wet cake. The filtering process must be continued only as long as a steady stream of water is exiting from the funnel. Excessive filtration time could result in some loss of VCM. The wet cake sample (0.10 to 4.5 grams) is added to a tared vial (including septum and aluminum cap) and immediately sealed. Sample weight is then determined to 3 decimal places. The sample is then placed in the Perkin-Elmer head space analyzer (or equivalent) and conditioned for one hour at 90°C. A sample of wet cake is used to determine TS (total solids). This is required for calculating the RVCM.

7.2.3 Dispersion resin slurry samples.—This material should not be filtered. Sample must be thoroughly mixed. Using a tared vial (including septum and aluminum cap) add approximately 8 drops (0.25 to 0.35 grams) of slurry or latex using a medicine dropper. This should be done immediately after mixing. Seal the vial as soon as possible. Determine sample weight accurate to 0.001 grams. Total sample weight must not exceed 0.50 grams. Condition the vial for one hour at 90°C in the analyzer. Determine the TS on the slurry sample (Section 7.3.5).

7.2.4 Inprocess wastewater samples—Using a tared vial (including septum and aluminum cap) quickly add approximately 1 cc of water using a medicine dropper. Seal the vial as soon as possible. Determine sample weight accurate to 0.001 gram. Condition the vial for two hours at 90°C in the analyzer.

7.3 Analysis.

7.3.1 Preparation of gas chromatograph—Install the chromatographic column and condition overnight at 150°C. Do not connect the exit end of the column to the detector while conditioning.

7.3.1.1 Flow rate adjustments—Adjust flow rates as follows:

a. Nitrogen carrier gas—Set regulator on cylinder to read 50 psig. Set regulator on chromatograph to 1.3 kg/cm². Normal flows at this pressure should be 25 to 40 cc/minute. Check with bubble flow meter.

b. Burner air supply—Set regulator on cylinder to read 50 psig. Set regulator on chromatograph to supply air to burner at a rate between 250 and 300 cc/minute. Check with bubble flowmeter.

c. Hydrogen supply—Set regulator on cylinder to read 30 psig. Set regulator on chromatograph to supply approximately 35±5 cc/minute. Optimize hydrogen flow to yield the most sensitive detector response without extinguishing the flame. Check flow with bubble meter and record this flow

7.3.1.2 Temperature adjustments—Set temperatures as follows:

a. Oven (chromatographic column), 80° C.

b. Dosing line, 140° C.

c. Injection block, 140° C.

d. Sample chamber, water temperature, 90° C±1.0° C.

7.3.1.3 Ignition of flame ionization detector—Ignite the detector according to the manufacturer's instructions.

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[1] Mention of trade names on specific products does not constitute endorsement by the Environmental Protection Agency.

7.3.1.4 Amplifier balance—Balance the amplifier according to the manufacturer's instructions.

7.3.2 Programming the chromatograph—Program the chromatograph as follows:

a. I—Dosing time—The normal setting is 2 seconds.

b. A—Analysis time—The normal setting is 8 minutes. Certain types of samples contain high boiling materials which can cause interference with the vinyl chloride peak on subsequent analyses. In these cases the analysis time must be adjusted to eliminate the interference. An automated backflush system can also be used to solve this problem.

c. B—Flushing—The normal setting is 0.2 minutes.

d. W—Stabilization time—The nomal setting is 0.2 minutes.

e. X—Number of analyses per sample—The normal setting is 1.

7.3.3 Preparation of sample turntable—Before placing any sample into turntable, be certain that the center section of the aluminum cap has been removed. The numbered sample bottles should be placed in the corresponding numbered positions in the turntable. Insert samples in the following order:

Positions 1 & 2—Old 2000 ppm standards for conditioning. These are necessary only after the analyzer has not been used for 24 hours or longer.

Position 3—50 ppm standard, freshly prepared.

Position 4—500 ppm standard, freshly prepared.

Position 5—2000 ppm standard, freshly prepared.

Position 6—4000 ppm standard, freshly prepared.

Position 7—Sample No. 7 (This is the first sample of the day, but is given as 7 to be consistent with the turntable and the integrator printout.)

After all samples have been positioned, insert the second set of 50, 500, 2000, and 4000 ppm standards. Samples, including standards must be conditioned in the bath of 90° C for 1 hour (not to exceed 5 hours).

7.3.4 Start chromatograph program—When all samples, including standards, have been conditioned at 90° C for 1 hour, start the analysis program according to the manufacturers' instructions. These instructions must be carefully followed when starting and stopping program to prevent damage to the dosing assembly.

7.3.5 Determination of total solids (TS).

For wet cake, slurry, resin solution, and PVC latex samples, determine TS for each sample by accurately weighing approximately 3 to 4 grams of sample in an aluminum pan before and after placing in a draft oven (105 to 110° C). Samples must be dried to constant weight. After first weighing return the pan to the oven for a short period of time and then reweigh to verify complete dryness. TS is then calculated as the final sample weight divided by initial sample weight.

8. Calibration.

Calibration is to be performed each eight-hour period when the instrument is used. Each day, prior to running samples, the column should be conditioned by running two of the previous days 2000 ppm standards.

8.1 Preparation of Standards.

Calibration standards are prepared by filling the vials with the vinyl chloride/nitrogen standards, rapidly seating the septum and sealing with the aluminum cap. Use a stainless steel line from the cylinder to the vial. Do not use rubber or tygon tubing. The sample line from the cylinder must be purged (into hood) for several minutes prior to filling vials. After purging, reduce the flow rate to approximately 500–1000 cc/min. Place end of tubing into vial (near bottom) and after one minute slowly remove tubing. Place septum in vial as soon as possible to minimize mixing air with sample. After the standard vials are sealed, inject 100 μl of distilled water.

8.2 Preparation of chromatograph calibration curve.

Prepare two 50 ppm, two 500 ppm, two 2000 ppm, and two 4000 ppm standard samples. Run the calibration samples in exactly the same manner as regular samples. Plot A_s, the integrator area counts for each standard sample vs C_c, the concentration of vinyl chloride in each standard sample. Draw a line of best fit through the points.

9. Calculations.

9.1 Response factor.

From the calibration curve described in Section 8.2, above, select the value of C_c that corresponds to A_s for each sample. Compute the response factor, R_f, for each sample, as follows:

$$R_f=\frac{A_s}{C_c} \quad \text{Equation 107-1}$$

9.2 Residual vinyl chloride monomer concentration, or vinyl chloride monomer concentration.

Calculate C_{rvc} as follows:

$$C_{rvc}=\frac{A_s P_a}{R_f T_1}\left(\frac{M_v V_g}{m_s R}+K T_2\right)$$

Equation 107-2

where:

C_{rvc}=Concentration of vinyl chloride in the sample, in ppm.

P_a=Laboratory atmosphere pressure, mm Hg.

T_1=Room temperature, °K.

M_v=Molecular weight of VCM (62.5).

V_g=Volume of vapor phase (vial volume less sample volume).

m_s=Weight of sample, grams.

R=Gas constant (62,360).

K=Henry's Law constant for VCM in PVC at 90°C, $K=6.52\times10^{-6}=K_p$, for VCM in 1 cc (approximate) wastewater sample at 90°C, $K=5.0\times10^{-6}=K_w$.

T_2=Equilibration temperature, °K.

If the following conditions are met, Equation 107-2 can be simplified as follows:

1. T_1=22° C (295° K).
2. T_2=90° C (363° K).
3. P_a=720 mm. Hg.
4. $V_g=V_v-\frac{m_s}{1.4}=23.5-\frac{m_s}{1.4}$

where

V_v=Vial volume, cc (23.5).

5. Sample contains less than 0.5% water.

$$C_{rvc}=\frac{A_s}{R_f}\left(4.197\times10^{-3}+\frac{5.988\times10^{-4}}{m_s}\right)$$

Equation 107-3

The following general equation can be used for any sample which contains VCM, PVC and/or water.

$$C_{rvc}=\frac{A_s P_a}{R_f T_1}\times\left[\frac{M_v V_g}{R m_s}+K_p(TS)T_2+K_w(1-TS)T_2\right]$$

Equation 107-4

where:

T_s=Total solids.

Note: K_w must be determined.

Results calculated using Equation 107-4 represent concentration based on the total sample. To obtain results based on dry PVC content, divide by TS.

For a 1 cc (approximate) wastewater sample, Equation 107-4 can be simplified to the following:

$$C_{rvc}=\frac{A_s}{R_f}\left[\frac{5.988\times10^{-4}}{m_s}+(2.066\times10^{-3})\right]$$

Equation 107-5

10. References.

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SECTION III

FULL TEXT
OF
REVISIONS

NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

SECTION III

FULL TEXT OF REVISIONS AND OTHER FEDERAL REGISTER NOTICES

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Title 40—Protection of Environment

CHAPTER 1—ENVIRONMENTAL PROTECTION AGENCY

SUBCHAPTER C—AIR PROGRAMS

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Asbestos, Beryllium, and Mercury

On March 31, 1971 (36 FR 5931), pursuant to section 112 of the Clean Air Act, as amended, the Administrator published an initial list of three hazardous air pollutants which, in his judgment may cause, or contribute to, an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness. The pollutants were asbestos, beryllium, and mercury. On December 7, 1971 (36 FR 23239), the Administrator proposed standards for these pollutants.

Interested persons participated in the rulemaking by giving testimony at public hearings and by sending comments to EPA. Public hearings were held in New York City on January 18, 1972, and in Los Angeles on February 15 and 16, 1972. A third hearing, scheduled to be held in Kansas City, on February 1, 1972, was canceled because of a lack of requests to participate. Sixty-eight persons gave testimony at the public hearings, and 56 persons sent comments to EPA. Represented were industries, universities, governmental agencies—Federal, State, and local, and environmental groups. Copies of the public hearing records are available at all EPA Regional Offices and at the Division of Stationary Source Enforcement, room 3220, 401 M Street SW., Washington, D.C. 20460, where copies of the comments received are also available.

The bases for the Administrator's determinations that asbestos, beryllium, and mercury are hazardous, the derivations of the standards now adopted, the Environmental Protection Agency's responses to the significant comments received, and the principal revisions to the proposed standards are summarized below. A more detailed statement is available on request from the Emission Standards and Engineering Division, Environmental Protection Agency, Research Triangle Park, N.C. 27711, Attention: Mr. Don Goodwin. In addition, the Administrator is issuing information on control techniques for asbestos, beryllium, and mercury as directed by section 112(b)(2) of the act. Copies of these documents may be obtained free of charge from EPA Regional Offices.

ASBESTOS

Asbestos is a hazardous air pollutant within the meaning of section 112. Many persons exposed to asbestos dust developed asbestosis when the dust concentration was high or the duration of exposure was long (*1–7*). A large number of studies have shown that there is an association between occupational exposure to asbestos and a higher-than-expected incidence of bronchial cancer (*8–30*). Asbestos also has been identified as a causal factor in the development of mesotheliomas, cancers of the membranes lining the chest and abdomen (*30–47*). There are reports of mesotheliomas associated with nonoccupational exposures in the neighborhood of asbestos sources (*38, 42, 47, 48*). An outstanding feature has been the long period, commonly over 30 years, between the first exposure to asbestos and the appearance of a tumor (*49, 50*). There is evidence which indicates that mesothliomas occur after much less exposure to asbestos dust than the exposure associated with asbestos (*51, 52*).

It is not practicable, at this time, to establish allowable numerical concentrations or mass emission limits for asbestos. Satisfactory means of measuring ambient asbestos concentrations have only recently been developed, and satisfactory means of measuring asbestos emissions are still unavailable. Even if satisfactory means of measuring asbestos emissions did exist, the previous unavailability of a satisfactory means of measuring ambient levels of asbestos makes it impossible to estimate even roughly the quantitative relationship between asbestos-caused illness and the doses which caused those illnesses. This is a major problem, since some asbestos caused illnesses have a 30-year latency period.

EPA considered the possibility of banning production, processing, and use of asbestos or banning all emissions of asbestos into the atmosphere, but rejected these approaches. The problem of measuring asbestos emissions would make the latter approach impossible to enforce. Either approach would result in the prohibition of many activities which are extremely important; moreover, the available evidence relating to the health hazards of asbestos does not suggest that such prohibition is necessary to protect public health. For example, demolition of any building containing asbestos fireproofing or insulating materials would have to be prohibited as would the use of materials containing even trace amounts of asbestos which could escape into the atmosphere.

Finally, the available evidence suggests a gradient of effects from direct occupational, to indirect occupational exposure, to families of workers exposed to asbestos and persons in the neighborhood of asbestos sources—in all of which situations asbestos concentrations are undoubtedly high by comparison with most community air. This suggests that there are levels of asbestos exposure that will not be associated with any detectable risk, although these levels are not known (*53*).

It is probable that the effects of asbestos inhalation are cumulative; that is, low-level and/or intermittent exposure to asbestos over a long time may be equally as important in the etiology of asbestotic disease as high level and/or continuous exposure over a shorter period. On the other hand, the available evidence does not indicate that levels of asbestos in most community air cause asbestotic disease. Taking both these considerations into account, the Administrator has determined that, in order to provide an ample margin of safety to protect the public health from asbestos, it is necessary to control emissions from major man-made sources of asbestos emissions into the atmosphere, but that it is not necessary to prohibit all emissions.

In this determination, the Administrator has relied on the National Academy of Sciences' report on asbestos (*53*), which concludes: "Asbestos is too important in our technology and economy for its essential use to be stopped. But, because of the known serious effects of uncontrolled inhalation of asbestos minerals in industry and uncertainty as to the shape and character of the dose-response curve in man, it would be highly imprudent to permit additional contamination of the public environment with asbestos. Continued use at minimal risk to the public requires that the major sources of man-made asbestose emission into the atmosphere be defined and controlled."

The means of control used are limitations on visible emissions with an option in some cases to use designated control equipment, requirements that certain procedures be followed, and prohibitions on the use of certain materials or of certain operations. These means of control are required because of the impossibility at this time of prescribing and enforcing allowable numerical concentrations or mass emission limitations known to provide an ample margin of safety. The alternative of no control of the sources subject to this standard was rejected because of the significant health hazard of unregulated emissions of asbestos into the atmosphere from the designated major sources.

It is the Administrator's judgment that the asbestos sources subject to this standard are the major sources of asbestos emissions. In the absence of quantitative emission data, the Administrator's judgment was based on an national inventory of sources and emissions of asbestos (*54*) and other reports (*53, 55*). The asbestos emissions and emission factors presented in the national inventory were based on information obtained from production and reprocessing companies. This information included production figures, estimates of control equipment efficiency and material balances; it did not include emission test results. The major sources of asbestos emissions were considered to fall into five categories: (1) Mining and milling; (2) manufacturing; (3) fabrication; (4) demolition; and (5) spraying. In determining which of these major sources should be covered by the standard promulgated herein, the Administrator considered the effect other Federal regulations will have on the emissions from such sources and the proximity of such sources to the public. In addition, the Administrator considered comments on the proposed standard and additional technical data not available before proposal. The following paragraphs explain these considerations and the changes made to the standard between proposal and final promulgation.

The promulgated standard applies to asbestos mills, selected manufacturing operations, the use of spray-on asbestos

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References at end of article.

materials, demolition operations, and the surfacing of roadways with asbestos tailings. The Administrator will continue to investigate other existing and new sources of asbestos emission and if any of them are found to be major sources, the standard will be revised to cover them.

As applied to mines, the proposed standard would have limited the emissions from drilling operations and prohibited visible emissions of particulate matter from mine roads surfaced with asbestos tailings. The Bureau of Mines has prescribed health and safety regulations (30 CFR 55.5) for the purpose of protecting life, the promotion of health and safety, and the prevention of accidents in open pit metal and nonmetallic mines. As related to asbestos mines, these regulations prohibit persons working in a mine from being exposed to asbestos concentrations which exceed the threshold limit value adopted by the American Conference of Governmental Industrial Hygienists. The regulations specify that respirators shall not be used to prevent persons from being exposed to asbestos where environmental measures are available. For drilling operations, the regulations require that the holes be collared and drilled wet. The regulations recommend that haulage roads, rock transfer points, crushers, and other points where dust (asbestos) is produced sufficient to cause a health or safety hazard be wetted down as often as necessary unless the dust is controlled adequately by other means. In the judgment of the Administrator, implementation of these regulations will prevent asbestos mines from being a major source which must be covered by the standard promulgated herein. Furthermore, the public is sufficiently removed from the mine work environment that their exposure should be significantly less than that of the workers in the work environment. Accordingly, the promulgated standard does not apply to drilling operations or roadways at mine locations.

For asbestos mills, the proposed standard would have applied to ore dumps, open storage areas for asbestos materials, tailings dumps, ore dryers, air for processing ore, air for exhausting particulate material from work areas, and any milling operation which continuously generates inplant visible emissions. The promulgated standard prohibits visible emissions from any part of the mill, but it does not apply to dumps of asbestos tailings or open storage of asbestos ores. The Bureau of Mines' regulations previously referenced and regulations issued by the Occupational Safety and Health Administration (20 CFR 1910.93a) protect workers from the hazards of air contaminants in the work environment. The Occupational Safety and Health Administration regulations were promulgated on June 7, 1972. The regulations are intended to protect the health of employees from asbestos exposure by means of engineering controls (i.e. isolation, enclosures, and dust collection) rather than by personal protective equipment. It is the judgment of the Administrator that measures taken to comply with the Bureau of Mines and Occupational Safety and Health Administration regulations to protect the health of persons who work in proximity to dumps and open storage areas will prevent the dumps and storage areas from being major sources of asbestos emissions.

The proposed standard would have applied to buildings, structures, or facilities within which any fabricating or manufacturing operation is carried on which involves the use of asbestos materials. Comments received on the proposed standard indicated that the requirements for fabricating and manufacturing operations were confusing. Much of the confusion was created by the use of terms such as "any," "continuously," and "forced gas streams." The promulgated standard is more definitive as to applicability of the provisions. The promulgated standard prohibits visible emissions from the nine manufacturing operations which, in the judgment of the Administrator, are major sources of asbestos. The promulgated standard does not cover fabrication operations. Of all fabrication operations, only those operations at new construction sites are considered to be major sources of asbestos emissions. The Occupational Safety and Health Administration regulations specify that all hand- or power-operated tools (i.e. saws, scorers, abrasive wheels, and drills) which produce asbestos dust be provided with dust collection systems. In the judgment of the Administrator, implementation of these regulations will prevent fabrication operations from being a major source which must be covered by the standard promulgated herein.

The proposed standard would have prohibited visible emissions of asbestos particulate material from the repair or demolition of any building or structure other than a single-family dwelling. Comments indicated that the no visible emission requirement would prohibit repair or demolition in many situations, since it would be impracticable, if not impossible, to do such work without creating visible emissions. Accordingly, the promulgated standard specifies certain work practices which must be followed when demolishing certain buildings or structures. The standard covers institutional, industrial, and commercial buildings or structures, including apartment houses having more than four dwelling units, which contain friable asbestos material. This coverage is based on the National Academy of Sciences' report (53) which states, "In general, single-family residential structures contain only small amounts of asbestos insulation. Demolition of industrial and commercial buildings that have been fireproofed with asbestos-containing materials will prove to be an emission source in the future, requiring control measures." Apartment houses with four dwelling units or less are considered to be equivalent to single-family residential structures. The standard requires that the Administrator be notified at least 20 days prior to the commencement of demolition.

The proposed standard would have limited emissions from a number of sources by stipulating that such emissions could not exceed the amounts which would be emitted from the source if the source were equipped with a fabric filter, or, in some cases, a wet-collection air-cleaning device. This would have required a standardized emission-measuring technique, which is not currently available. The promulgated standard prohibits visible emissions which contain asbestos and provides the option of using specified air-cleaning methods. The existence of particulate asbestos material in a gas stream vented to the atmosphere can be determined by collecting a sample on a filter and analyzing it by microscopy techniques. The proposed standard stated that the air-cleaning requirement would not be met if a number of listed faults, e.g., broken bags, leaking gases, threadbare bags, existed and it required that collection hoppers on some baghouses be emptied without generating visible emissions. Comments received suggested that this negative approach tended to make the quality of air-cleaning operations dependent upon the ability of EPA to anticipate and to include in the standard all the factors which would constitute improper methods. Since the intent was, and is, to require high quality air-cleaning operations, the promulgated standard requires proper installation, use, operation, and maintenance without precisely defining the means to be used.

The proposed standard would have prohibited the spraying of any material containing asbestos on any portion of a building or structure, prohibited the spraying of any material containing asbestos in an area directly open to the atmosphere, and limited emissions from all other spraying of any material containing asbestos to the amount which would be emitted if specified air-cleaning equipment were used. Comments received pointed out that this standard would: (1) Prohibit the use of materials containing only the trace amounts of asbestos which occur in numerous natural substances, (2) prohibit the use of materials to which very small quantities of asbestos are added in order to enhance their effectiveness, and (3) prohibit the use of materials in which the asbestos is strongly bound and which would not generate particulate asbestos emissions. The promulgated standard applies to those uses of spray-on asbestos materials which could generate major emissions of particulate asbestos material. For those spray-on materials used to insulate or fireproof buildings, structures, pipes, and conduits, the standard limits the asbestos content to no more than 1 percent. Materials currently used contain from 10- to 80-percent asbestos. The intent of the 1-percent limit is to ban the use of materials which contain significant quantities of asbestos, but to allow the use of materials which would: (1) Contain trace amounts of asbestos which occur in numerous natural substances, and (2) include very small quantities of asbestos (less than 1 percent) added to enhance the material's effectiveness. Although a

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standardized reference method has not been developed to quantitatively determine the content of asbestos in a material, there are acceptable methods available, based on electron microscopy, which independent laboratories have developed. Determining the asbestos content of a material with these methods costs approximately $300, and the results are accurate within plus or minus 50 percent; these limits on accuracy were taken into account in establishing the 1-percent limitation.

The proposed standard would have prohibited the surfacing of any roadway with asbestos tailings. The promulgated standard applies to all roadways except those on ore deposits; these roadways are temporary, and control measures taken to comply with the Bureau of Mines regulations prevent them from being a major source which must be covered by the standard promulgated herein. At this time, the application of asbestos tailings to public roadways is not widely practiced, but because of the close proximity of roads to the public, a ban on using asbestos tailings on roadways is included in the promulgated standard to avoid a future problem and stop the practice where it is followed. The term "surfacing" is defined to include the deposit of asbestos tailings on roadways covered with snow or ice; therefore, this practice is prohibited.

Consideration was given to including provisions in the standard requiring proper disposal of the asbestos material generated during demolition and collected in control devices used to comply with the requirements of this standard. It was decided that this was not necessary because the Occupational Safety and Health Administration regulations (29 CFR 1910.93a(h)) include housekeeping and waste disposal requirements. These regulations require that any asbestos waste, consigned for disposal, be collected and disposed of in sealed impermeable bags or other closed, impermeable containers.

The potential environmental impact of the promulgated standard was evaluated, and it was concluded that the standard will not cause any adverse effects. The potentially adverse environmental effects of the standard are:

(1) The asbestos-materials which will be collected in control devices and generated during demolition will have to be disposed of or recycled.

(2) Materials, such as mineral wool, ceramic wool, and fiberglass, will be substituted for asbestos presently contained in spray-applied fireproofing and insulating materials.

In some manufacturing operations, a major portion of the asbestos-material collected by fabric filters is either recycled to the process or is marketed for other uses. For example, one asbestos textile mill recycles large quantities of longer-fiber asbestos for process use and sells more than 90 percent of the remaining collected materials to a brake lining manufacturer. Consequently, a significant portion of the increased quantities of "waste" asbestos materials which will result from the implementation of the standard will not require disposal. Where disposal is required, the Occupational Safety and Health Administration regulations (29 CFR 1910.93a(h)) require that any asbestos waste, consigned for disposal, be collected and disposed of in sealed impermeable bags or other closed, impermeable containers. The contamination of ground water supplies with asbestos from landfill disposal is not considered a potential problem.

The substitution of ceramic wool, mineral wool, and fiberglass for asbestos is not now known to be a problem. There is no evidence that these materials cause health effects in the concentrations found in occupational or ambient environments.

Although the standard was not based on economic considerations, EPA is aware of the impact (55) and considers it to be reasonable. Costs among the various sources covered by the standard are quite variable. Although the standard may adversely affect some individual plants or companies which are marginal operations, it appears that such effects will be minimal and the impact to the asbestos industries as a whole will not be large.

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BERYLLIUM

Beryllium is a hazardous air pollutant within the meaning of section 112. The proven effects of airborne beryllium materials on human health include both acute and chronic lethal inhalation effects (*1, 2*), as well as skin and conjunctival effects (*2*). Insufficient data are available to incriminate beryllium as a human carcinogen (*1, 2*), but the lack of of any mechanism for the total elimination of beryllium body burdens, and the resulting possibly long residence time may enhance the opportunity for cancer induction. The Beryllium Registry now contains over 820 proven cases of beryllium-related disease (*3*), but since many of these were most likely due to exposure prior to the institution of controls, proper assessment of the period of exposure is not always possible (*1, 2*); it is known, however, that chronic beryllium disease is associated not only with activities involving extraction processes, but also that 64 registry cases resulted from exposure during machining operations on beryllium materials (*3*). There are at least 45 cases of nonoccupationallyincurred diseases on file with the registry, of which approximately half have been fatal (*3*), and retrospective studies of the concentrations of beryllium that resulted in some cases of chronic beryllium disease from nonoccupational exposure have concluded that the lowest concentration which produced disease was greater than 0.01 $\mu g/m^3$ and probably less than 0.10 $\mu g/m^3$ (*4*).

In 1949, when it became apparent that beryllium was a toxic material, the Atomic Energy Commission adopted a limit for beryllium concentrations in community air (i.e., 0.01 μg of beryllium per cubic meter of air averaged over a 30-day period) (2). Beryllium refining companies holding contracts with the AEC to operate AEC-owned refinery facilities and expand their own refinery capacity to meet AEC's beryllium requirements, were required to observe the community air limit. With the termination of these contracts in the 1961–63 period due to a reduction in AEC requirements for beryllium, the refineries were no longer subject to the AEC community air limit. The AEC's health and safety requirements, however, have continued to apply to all AEC-owned facilities, some of which fabricate and assemble beryllium parts.

In the period since the implementation of the AEC guideline, no reported cases of chronic beryllium disease have occurred as a result of community exposure, and the Committee on Toxicology of the National Academy of Sciences concluded that the AEC guideline limit represents a safe level of exposure (*1*).

Accordingly, the Administrator has determined that in order to provide an ample margin of safety to protect the public health from beryllium, sources of beryllium dust, fume, or mist emissions into the atmosphere should be controlled to insure that ambient concentrations of beryllium do not exceed 0.01 $\mu g/m^3$—30-day average.

The beryllium standard covers extraction plants, foundries, ceramic manufacturing plants, machine shops (processing beryllium or beryllium alloys containing in excess of 5 percent beryllium) and disposal of beryllium-containing wastes. Most affected beryllium sources are limited to emissions of not more than 10 grams per day. This level was determined through dispersion estimates as the level which would protect against the occurrence of 30-day average ambient concentrations exceeding 0.01 $\mu g/m^3$. The sources covered by the standard are the only known ones that could result in ambient beryllium concentrations in excess of 0.01 $\mu g/m^3$. The assumptions and equations used to make the dispersion estimates are given in the Background Information Report for Asbestos, Beryllium, and Mercury (APTD-0753), published at the time the standards were proposed.

Rocket testing facilities are required to meet the limit of 75 microgram-minutes per cubic meter, accumulated during any period of 2-consecutive weeks. The limit for rocket testing facilities is the same as that developed in 1966 by the Committee on Toxicology of the National Academy of Sciences for protection of off-site personnel from intermittent exposures to soluble beryllium compounds arising from the firing of rocket motors (*1*).

The proposed standard did not include a provision on open burning of beryllium-containing waste. The promulgated standard includes a ban on open burning of beryllium-containing waste. This change was made because information received after proposal indicated that such sources can cause ambient concentrations of beryllium in excess of 0.01 $\mu g/m^3$ and because it is not possible to control the emissions from open burning. The promulgated standard does allow disposal of beryllium-containing waste in incinerators which are controlled so as not to exceed the 10-gram-per-day limit. The disposal of beryllium-containing explosive waste is included in the standard covering rocket testing.

The proposed standard would have covered all machining operations which use alloys containing any amount of beryllium. Comments were received which claimed that numerous machining operations use alloys containing low concentrations of beryllium and do not exceed the 10-gram-per-day emission limitation. An investigation of these comments revealed that alloys which include beryllium either contain a large amount (greater than 60 percent) or a small amount (less than 5 percent), and that approximately 8,000 machining operations use the low beryllium content alloys. Tests were conducted by the Agency to determine the beryllium emissions from the operations which use the low beryllium content alloys (e.g. stamping, tube drawing, milling, and sawing). The results indicated that even if the emissions were vented to the outside air, which they ordinarily are not, they would be significantly below the 10-gram-per-day emission limitation. After considering these results and the administrative burden if the standard applied to such a large number of sources, the proposed standard was changed to exempt the machining operations which use alloys containing less than 5-percent beryllium.

The proposed standard would have allowed all sources of beryllium to choose between meeting the 10-gram-per-day emission limit and complying by use of ambient monitoring to insure that the 0.01 $\mu g/m^3$ 30-day average is never exceeded. After reconsidering the proposed standard and the difficulty inherent in using ambient air quality data, as opposed to emission data, as a regulatory tool, it was decided to limit the use of ambient data as a means of compliance

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to those sources which have demonstrated over a reasonable past period that they can meet and have met the ambient limitation. Therefore, the standard being promulgated herein allows the ambient option only to existing sources which have 3 years of current ambient air quality data which demonstrate to the Administrator's satisfaction that the 0.01 $\mu g/m^3$ level can be met in the vicinity of the source. A minimum of 3 years of data was judged to be necessary to demonstrate that the ambient guideline of 0.01 $\mu g/m^3$ (30-day average) can be met because of the possibility of monthly, seasonal, and even annual variations in ambient levels caused by variations in meteorology and production. The existing sources which could qualify or this option are four beryllium extraction plants and, possibly, a small number of machine shops. These sources were designed or modified to facilitate compliance with the 0.01 $\mu g/m$ ambient limit.

The potential environmental impact of this standard was evaluated and it was concluded that the standard will not cause any adverse effects. Beryllium is a very expensive material, and most gas streams emitting significant quantities of beryllium are controlled with high efficiency dry collectors, and the collected material is recycled or sold back to the primary producers. Wet collectors are rarely used strictly as an air pollution control device, but more often as an extraction process control device allowing recycle of waste liquids to the process. Absolute filters are often used as final filters and collect small quantities of beryllium from very low concentration gas streams. These filters are usually buried in company owned or segregated dumps or stored in unused mines or buildings. Most of the solid wastes are prepackaged prior to burial to prevent escape of beryllium to the environment.

Although the standard is not based on economic considerations, EPA is aware of the economic impact (*5*) of the standard. Since most of the sources of beryllium emissions are already controlled and in compliance with the standard, the economic impact will be very small.

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MERCURY

Mercury is a hazardous air pollutant within the meaning of section 112. Exposure to metallic mercury vapors may cause central nervous system injury, and renal damage (*1*, *3*). Experience with mercury vapor comes almost exclusively from animal experiments and industrial exposures. Animal (rat) data indicate a risk of accumulation in critical systems upon prolonged exposure, with a potential, for example, for selective brain damage (*2*, *3*). Prolonged exposure to about 100 micrograms mercury per cubic meter of air involves a definite risk of mercury intoxication (*3*).

To determine the ambient air level of mercury that does not impair health, the airborne burden must be considered together with the water- and food-borne burdens. An expert group concluded, based on its analysis of several episodes of mercury poisoning in Japan, that 4 micrograms of methylmercury per kilogram of bodyweight per day would result in the intoxication of a sensitive adult; application of a safety factor of 10 yielded an acceptable exposure of about 30 micrograms per day for a 70-kilogram man, and this level is also believed to provide satisfactory protection against genetic lesions, and poisoning of the fetus and of children (*4*).

It should be noted that methylmercury is considered to be by far the most hazardous mercury compound, particularly via the ingestion of fish in which it has been concentrated through the food chain, (*3*, *5*). The Environmental Protection Agency, in view of the present limited knowledge as to the effects of inhaled mercury in the general population, and in order to best assure the requisite "ample margin of safety to protect the public health," has concluded that it is prudent to consider exposures to methylmercury (diet) and mercury vapor (air) to be equivalent and additive. It has been estimated that from average diets, over a considerable period, mercury intakes of 10 micrograms per day may be expected (*6*), so that, in order to restrict total intake to 30 micrograms per day, the average mercury intake from air would have to be limited to 20 micrograms per day. Assuming inhalation of 20 cubic meters of air per day, the air could contain an average daily concentration of no more than 1 microgram of mercury per cubic meter.

The standard promulgated herein regulates the only two sources, mercury ore processing facilities and mercury cell chlor-alkali plants, which have been found to emit mercury in a manner that could cause the ambient concentration to exceed the inhalation effects limits of 1 microgram per cubic meter. The standard limits emissions from these facilities to not more than 2,300 grams per day. The emission limit of 2,300 grams per day was derived from dispersion estimates as the level which would protect against the violation of an average daily ambient concentration of 1 microgram per cubic meter. The assumptions and equations used to make the dispersion estimates are given in the Background Information Report for Asbestos, Beryllium, and Mercury (APTD-0753), published at the time the standards were proposed.

Many mercury cell chlor-alkali plant cell rooms present severe source testing problems due to their design and construction. Such sources may either reconstruct the cell room so that accurate source tests can be made or employ housekeeping and maintenance practices that minimize mercury emissions from the cell room. Source test data and calculations have indicated that when such practices are used, 1,300 grams per day is a reasonable estimate of emissions from the cell room. Therefore, when this option is chosen, an emission of 1,300 grams per day will be assigned to the cell room. This permits emissions of not more than 1,000 grams per day from the hydrogen and end box ventilation streams combined.

Compliance with the standard will be determined by the EPA reference method or EPA-approved substitute methods. Where a chlor-alkali plant chooses the housekeeping and maintenance practices option, determination of compliance of the cell room emission will be based on the use of EPA-approved practices. A list of approved practices may be obtained from EPA on request to regional offices.

The only major change in the mercury standard is the introduction of the above option of assigning an emission number to the cell room provided certain housekeeping and maintenance requirements are met. When this option is chosen, testing is not required for emissions from the cell room. This option is offered because comments, testimony, and EPA source testing experience indicated that most existing cell rooms cannot be accurately tested for mercury emissions. Accurate emission tests are unduly complicated and costly because of the cell room configuration.

Some of the changes suggested in written comments and public hearing testimony were considered by EPA but not made. The most significant one involved the environmental chemistry of mercury, that is, environmental mercury in the atmosphere is transformed to mercuric oxide by the action of ultraviolet radiation, and since mercuric oxide is not as toxic as elemental mercury, the standard should be less stringent. This argument is based on laboratory experiments under controlled conditions with generated radiation. The reaction cited in the testimony occurs when elemental mercury is irradiated with ultraviolet light with a wavelength of 2,537 angstrom (A). Naturally occurring ozone in the upper atmosphere absorbs light in the ultraviolet region below 3,000 A; (*7*) hence the wavelength of ultraviolet necessary for the reaction is absent in the ambient atmosphere, and the reaction does not proceed at as high a rate as implied by the submitted testimony. Field measurements of both mercury vapors and particulate mercury in ambient air indicate that as much as 96 percent of the mercury de-

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tected was in an elemental vapor form (data collected by EPA at the Federal Building in Moundsville, W. Va.).

The Environmental Protection Agency recognises that mercury and its compounds constitute a multimedia contapounds constitute a multimedia contamination problem, i.e., strong evidence alter its natural distribution in the environment; that such uses may cause or hasten additional deposits into water or soil over and above those occurring naturally, thereby building up environmental concentrations; and the mercury levels accumulate in the biota, with the result that potentially dangerous residue levels are reached in foods consumed by man and animals.

Current data on the environmental transport of mercury do not permit a clear assessment of the effect of mercury emissions into the atmosphere on the mercury content in the aquatic and terrestrial environments. Results of ongoing research will determine if there is a need for more comprehensive control of mercury emissions into the air. The standard promulgated herein is intended to protect the public health from the effects of inhaled mercury.

The environmental impact of this standard was evaluated and it was concluded that the standard will not cause any adverse effects since the control of mercury emissions to the atmosphere will have only minimal impact on other areas of environmental concern. The simplest control for mercury emissions to the atmosphere is cooling to condense the mercury. This cooling can be indirect or direct. By indirect cooling, the mercury condenses and is retained for recycle or sale. By direct cooling with a water scrubber, the water is usually recirculated after using centrifugal or gravitational separation to remove the mercury. The water cannot be reused indefinitely and eventually requires additional treatment to remove the mercury. In most cases, such treatment facilities are already being utilized to meet water quality standards.

A widely used control device for particulate mercury emissions is the mist eliminator. Residues in these devices are removed by gravity and washing with a recycled liquid. Another control method is chemical scrubbing. In this system, scrubbing liquids are continuously made up while waste materials are usually recycled to the process feed solutions. Recycling of these liquids avoids significant contamination of water with mercury residues.

The use of adsorption beds is a highly efficient control method for removing mercury from gas streams. Two primary types are available: (1) Chemically treated activated carbon beds, and (2) molecular sieves. Most of the mercury collected by activated carbon can be reclaimed by retorting the carbon but this usually destroys the carbon structure and necessitates disposal. Some small amount of residual mercury will remain with the carbon, but it is tightly bound and is not easily transferred into the air or water. Regenerative molecular sieves do not cause a waste disposal problem because the sieves can be regenerated in place without retorting and can be reused many times.

Although the standard was not based on economic considerations, EPA is aware of the impact (*8*) and considers it to be reasonable. Because mercury is an international commodity, world prices determine the fortunes of the domestic mercury mining industry. Historically, mercury prices fluctuate greatly in response to small changes in demand or supply. Domestic mercury mines are considered high-cost producers in relation to foreign producers. Because the average price has dropped from $404 per flask in 1969 to approximately $320 currently, the number of domestic mercury mines in operation has dropped sharply from 109 in 1969 to six or seven in March 1973. As long as the price of mercury remains below marginal costs of production (generally about $400), the remaining domestic mines will be ill equipped to absorb any cost increases.

The total chlor-alkali industry comprises 68 plants. Approximately 28 are mercury cell plants and account for about 27 percent of the U.S. production of chlorine and caustic.

The future of the chlorine-caustic industry appears healthy. Demand for chlorine is expected to grow at an annual rate of 6 percent projected from 1971. Demand for caustic soda will grow at least at the same rate as chlorine, and perhaps faster. Prices for chlorine and sodium hydroxide have been rising steadily through the sixties into 1971. Based on these trends, the cost of control to comply with the mercury standard will be passed forward to the consumer. Use of these two basic commodities is so diverse that any price increases will be well dispersed through all manufacturing activities.

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GENERAL PROVISIONS

The standards promulgated below are applicable to new, modified, and existing sources. Any new or modified source must comply with the standards upon beginning operation. Any existing source must comply with the standards within 90 days after promulgation, unless a waiver of compliance is granted.

After considering the proposed general provisions and the comments received on them, the Administrator made several changes which are included in the standards promulgated below. A new section was added to specifically require new stationary sources to notify the Administrator before beginnning operation. The requirements for source reporting and request for waiver of compliance were combined into one section. The time for submitting the source report was extended from 30 to 90 days to provide sources with more time to complete the information required. Appendix A was added to provide sources a description and format of the information required.

The proposed standards required all sources of mercury and beryllium to test their emissions within 3 months of the effective date and at least once every 3 months thereafter; a provision was included to allow the Administrator to waive the periodic tests for sources in compliance with a standard. The standards promulgated below require the initial test within 90 days of the effective date and include a provision to allow the Administrator to waive this requirement if the source is meeting the standard or has requested a waiver of compliance. Periodic tests are not required unless specifically requested by the Administrator. The Administrator may cancel a waiver of emission tests and may require a test under the authority of section 114 of the Act at any time. Appendix A specifies the information which a source must provide the Administrator when applying for a waiver of initial emission testing.

The standards promulgated below do not require the owner or operator to request a waiver of compliance before a specific date. However, the owner or operator should submit the request within 30 days after the effective date of the regulation to be assured that action will be taken on the waiver application prior to the 90th day after the effective date. Continued operation in excess of a standard after the 90th day without a waiver is a violation of the act.

The Administrator may grant an existing source a waiver, permitting a period of up to 2 years for compliance, provided that steps will be taken during the waiver period to assure that the health of persons will be protected from imminent endangerment and provided that such period is necessary for the installation of controls. To be granted a waiver of compliance, a source must submit a written request to the Administrator and provide certain information to assist the Administrator in making a judgment.

Within 60 days after receiving a request, the Administrator will notify the owner or operator of approval or intention to deny the waiver. Any waiver of compliance granted by the Administrator will be in writing and specify conditions the source must meet during the waiver period. If the Administrator intends to deny a request, the owner or operator will be given a specified time to provide additional information or arguments prior to final action on the request. Final action on a request will be in writing by the Administrator, and if denied, will include reasons for denial.

The President may exempt any new, modified, or existing stationary source from compliance with the standards for a period of up to 2 years, provided the technology is not available to implement the standards and the operation of such source is required for reasons of national security. Also, the President may grant exemptions for additional periods of 2 years or less.

The construction of a new source or modification of an existing source covered by these standards cannot begin without approval of the Administrator. To obtain approval, the owner or operator of such sources must apply in writing to the Administrator. Within 60 days, the Administrator will notify the owner or operator of approval or intention to deny approval. If the Administrator intends to deny approval, a specified time will be given to provide additional information or arguments prior to final action on the application. The final action on any application will be in writing by the Administrator, and if denied, will include the reasons for denial.

Although the demolition of buildings or structures containing asbestos material and the spraying of asbestos material will in many cases be modifications of existing stationary sources, the Administrator's approval is not required before beginning such operations. Section 112(c)(1) of the act specifies that no person may construct any new source or modify any existing source "* * * unless the Administrator finds that such source if properly operated will not cause emissions in violation of such standard." The demolition and spraying provisions are expressed in terms of procedures to be followed. Therefore, if the source is properly operated, it will be complying with the standard, and there is no need for the Administrator to make a finding with respect to each new source subject to these provisions.

Each source covered by these standards is required to submit to the Administrator within 90 days after promulgation certain information pertaining to its operation. Changes in the information must be submitted within 30 days after the change, except where the change is considered a modification. Then the requirements for a modified source are applicable.

Three terms are associated with determining compliance by means of source testing: (1) Reference method, (2) equivalent method, and (3) alternative method. Reference methods are the preferred methods of sampling and analysing used to determine compliance. The reference methods for beryllium and mercury are included in appendix B to this part. An equivalent method is any method of sampling and analyzing which has been demonstrated to the Administrator's satisfaction to have a consistent and quantitatively known relationship to the reference method under specified conditions. An alternative method is any method of sampling and analyzing which does not meet all the criteria for equivalency but which can be used in specific cases to determine compliance. Alternative methods may be approved by the Administrator for source testing; however, in cases where determinations of compliance using an alternative method are disputed, use of the reference method or its equivalent will be required by the Administrator. An approved alternative method for beryllium is included in appendix B hereto.

All emission data provided to or obtained by the Administrator in carrying out these regulations will be available to the public. Records, reports, or information other than trade secrets will be available to the public.

Pursuant to section 112(d)(1) of the act, the Environmental Protection Agency intends to delegate the authority to implement and enforce national emission standards (except with respect to stationary sources owned or operated by the United States) for hazardous air pollutants to any State which submits an adequate procedure to the Administrator. The requisite procedure for requesting such delegation will be issued in the future by the Environmental Protection Agency.

The regulations for the national emission standards for asbestos, beryllium, and mercury are hereby promulgated effective upon promulgation (April 6, 1973).

Dated: March 30, 1973.

ROBERT W. FRI,
Acting Administrator,
Environmental Protection Agency.

A new Part 61 is added to Chapter 1, Title 40, Code of Federal Regulations, as follows:

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Method 101—Reference method for determination of particulate and gaseous mercury emissions from stationary sources (air streams).
Method 102—Reference method for determination of particulate and gaseous mercury emissions from stationary sources (hydrogen streams).
Method 103—Beryllium screening method.
Method 104—Reference method for determination of beryllium emissions from stationary sources.

AUTHORITY: 42 U.S.C. 1857c-7.

Subpart A—General Provisions

§ 61.01 Applicability.

The provisions of this part apply to the owner or operator of any stationary source for which a standard is prescribed under this part.

§ 61.02 Definitions.

As used in this part, all terms not defined herein shall have the meaning given them in the act:

(a) "Act" means the Clean Air Act (42 U.S.C. 1857 et seq.).

(b) "Administrator" means the Administrator of the Environmental Protection Agency or his authorized representative.

(c) "Alternative method" means any method of sampling and analyzing for an air pollutant which does not meet all of the criteria for equivalency but which has been demonstrated to the Administrator's satisfaction to, in specific cases, produce results adequate for his determination of compliance.

(d) "Commenced" means that an owner or operator has undertaken a continuous program of construction or modification or that an owner or operator has entered into a contractual obligation to undertake and complete, within a reasonable time, a continuous program of construction or modification.

(e) "Compliance schedule" means the date or dates by which a source or category of sources is required to comply with the standards of this part and with any steps toward such compliance which are set forth in a waiver of compliance under § 61.11.

(f) "Construction" means fabrication, erection, or installation of a stationary source.

(g) "Effective date" is the date of promulgation in the FEDERAL REGISTER of an applicable standard or other regulation under this part.

(h) "Equivalent method" means any method of sampling and analyzing for an air pollutant which has been demonstrated to the Administrator's satisfaction to have a consistent and quantitatively known relationship to the reference method, under specified conditions.

(i) "Existing source" means any stationary source which is not a new source.

(j) "Modification" means any physical change in, or change in the method of operation of, a stationary source which increases the amount of any hazardous air pollutant emitted by such source or which results in the emission of any hazardous air pollutant not previously emitted, except that:

(1) Routine maintenance, repair, and replacement shall not be considered physical changes, and

(2) The following shall not be considered a change in the method of operation:

(i) An increase in the production rate, if such increase does not exceed the operating design capacity of the stationary source;

(ii) An increase in hours of operation.

(k) "New source" means any stationary source, the construction or modification of which is commenced after the publication in the FEDERAL REGISTER of proposed national emission standards for hazardous air pollutants which will be applicable to such source.

(l) "Owner or operator" means any person who owns, leases, operates, controls, or supervises a stationary source.

(m) "Reference method" means any method of sampling and analyzing for an air pollutant, as described in appendix B to this part.

(n) "Startup" means the setting in operation of a stationary source for any purpose.

(o) "Standard" means a national emission standard for a hazardous air pollutant proposed or promulgated under this part.

(p) "Stationary source" means any building, structure, facility, or installation which emits or may emit any air pollutant which has been designated as hazardous by the Administrator.

§ 61.03 Abbreviations.

The abbreviations used in this part have the following meanings:

°C—Degrees Centigrade.
cfm—Cubic feet per minute.
ft^2—Square feet.
ft^3—Cubic feet.
°F—Degrees Fahrenheit.
in—Inch.
l—Liter.
ml—Milliliter.
M—Molar.
m^3—Cubic meter.
nm—Nanometer.
oz—Ounces.
v/v—Volume per volume.
yd^2—Square yards.
w.g.—Water gage.
inHg—Inches of mercury.
inH_2O—Inches of water.
g—Grams.
mg—Milligrams.
N—Normal.
°R—Degree Rankine.
min—Minute
sec—Second.
avg.—Average.
I.D.—Inside diameter.
O.D.—Outside diameter.
μg—Micrograms (10^{-6} gram).
%—Percent.
Hg—Mercury.
Be—Beryllium.

§ 61.04 Address.

All requests, reports, applications, submittals, and other communications to the Administrator pursuant to this part shall be submitted in duplicate and addressed to the appropriate regional office of the Environmental Protection Agency, to the attention of the Director, Enforcement Division. The regional offices are as follows:

Region I (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont), John F. Kennedy Federal Building, Boston, Mass. 02203.

Region II (New York, New Jersey, Puerto Rico, Virgin Islands), Federal Office Building, 26 Federal Plaza (Foley Square), New York, N.Y. 10007.

Region III (Delaware, District of Columbia, Pennsylvania, Maryland, Virginia, West Virginia), Curtis Building, Sixth and Walnut Streets, Philadelphia, Pa. 19106.

Region IV (Alabama, Florida, Georgia, Mississippi, Kentucky, North Carolina, South Carolina, Tennessee), Suite 300, 1421 Peachtree Street, Atlanta, Ga. 30309.

Region V (Illinois, Indiana, Minnesota, Michigan, Ohio, Wisconsin), 1 North Wacker Drive, Chicago, Ill. 60606.

Region VI (Arkansas, Louisiana, New Mexico, Oklahoma, Texas), 1600 Patterson Street, Dallas, Tex. 75201.

Region VII (Iowa, Kansas, Missouri, Nebraska), 1735 Baltimore Street, Kansas City, Mo. 64108.

Region VIII (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming), 916 Lincoln Towers, 1860 Lincoln Street, Denver, Colo. 80203.

Region IX (Arizona, California, Hawaii, Nevada, Guam, American Samoa), 100 California Street, San Francisco, Calif. 94111.

Region X (Washington, Oregon, Idaho, Alaska), 1200 Sixth Avenue, Seattle, Wash. 98101.

§ 61.05 Prohibited activities.

(a) After the effective date of any standard prescribed under this part, no owner or operator shall construct or modify any stationary source subject to such standard without first obtaining written approval of the Administrator in accordance with this subpart, except under an exemption granted by the President under section 112(c)(2) of the act. Sources, the construction or modification of which commenced after the publication date of the standards proposed to be applicable to such source, are subject to this prohibition.

(b) After the effective date of any standard prescribed under this part, no owner or operator shall operate any new source in violation of such standard except under an exemption granted by the President under section 112(c)(2) of the act.

(c) Ninety days after the effective date of any standard prescribed under this part, no owner or operator shall operate any existing stationary source in violation of such standard, except under a waiver granted by the Administrator in accordance with this subpart or under an exemption granted by the President under section 112(c)(2) of the act.

(d) No owner or operator subject to the provisions of this part shall fail to report, revise reports, or report source test results as required under this part.

§ 61.06 Determination of construction or modification.

Upon written application by an owner or operator, the Administrator will make a determination of whether actions taken or intended to be taken by such owner or operator constitute construction or modification or the commencement thereof within the meaning of this part. The Administrator will within 30 days of receipt of sufficient information to evaluate an application, notify the owner or operator of his determination.

§ 61.07 Application for approval of construction or modification.

(a) The owner or operator of any new source to which a standard prescribed under this part is applicable shall, prior to the date on which construction or modification is planned to commence, or within 30 days after the effective date in the case of a new source that already has commenced construction or modification and has not begun operation, submit to the Administrator an application for approval of such construction or modification. A separate application shall be submitted for each stationary source.

(b) Each application shall include:

(1) The name and address of the applicant.

(2) The location or proposed location of the source.

(3) Technical information describing the proposed nature, size, design, operating design capacity, and method of operation of the source, including a description of any equipment to be used for control of emissions. Such technical information shall include calculations of emission estimates in sufficient detail to permit assessment of the validity of such calculations.

§ 61.08 Approval by Administrator.

(a) The Administrator will, within 60 days of receipt of sufficient information to evaluate an application under § 61.07, notify the owner or operator of approval or intention to deny approval of construction or modification.

(b) If the Administrator determines that a stationary source for which an application pursuant to § 61.07 was submitted will, if properly operated, not cause emissions in violation of a standard, he will approve the construction or modification of such source.

(c) Prior to denying any application for approval of construction or modification pursuant to this section, the Administrator will notify the owner or operator making such application of the Administrator's intention to issue such denial, together with:

(1) Notice of the information and findings on which such intended denial is based, and

(2) Notice of opportunity for such owner or operator to present, within such time limit as the Administrator shall specify, additional information or arguments to the Administrator prior to final action on such application.

(d) A final determination to deny any application for approval will be in writing and will set forth the specific grounds on which such denial is based. Such final determination will be made within 60 days of presentation of additional information or arguments, or 60 days after the final date specified for presentation, if no presentation is made.

(e) Neither the submission of an application for approval nor the Administrator's granting of approval to construct or modify shall:

(1) Relieve an owner or operator of legal responsibility for compliance with any applicable provision of this part or of any other applicable Federal, State, or local requirement, or

(2) Prevent the Administrator from implementing or enforcing this part or taking any other action under the act.

§ 61.09 Notification of startup.

(a) Any owner or operator of a source which has an initial startup after the effective date of a standard prescribed under this part shall furnish the Administrator written notification as follows:

(1) A notification of the anticipated date of initial startup of the source not more than 60 days nor less than 30 days prior to such date.

(2) A notification of the actual date of initial startup of the source within 15 days after such date.

§ 61.10 Source reporting and waiver request.

(a) The owner or operator of any existing source, or any new source to which a standard prescribed under this part is applicable which had an initial startup which preceded the effective date of a standard prescribed under this part shall, within 90 days after the effective date, provide the following information in writing to the Administrator:

(1) Name and address of the owner or operator.

(2) The location of the source.

(3) The type of hazardous pollutants emitted by the stationary source.

(4) A brief description of the nature, size, design, and method of operation of the stationary source including the operating design capacity of such source. Identify each point of emission for each hazardous pollutant.

(5) The average weight per month of the hazardous materials being processed by the source, over the last 12 months preceding the date of the report.

(6) A description of the existing control equipment for each emission point.

(i) Primary control device(s) for each hazardous pollutant.

(ii) Secondary control device(s) for each hazardous pollutant.

(iii) Estimated control efficiency (percent) for each control device.

(7) A statement by the owner or operator of the source as to whether he can comply with the standards prescribed in this part within 90 days of the effective date.

(b) The owner or operator of an existing source unable to operate in compliance with any standard prescribed under this part may request a waiver of compliance with such standard for a period not exceeding 2 years from the effective date. Any request shall be in writing and shall include the following information:

(1) A description of the controls to be installed to comply with the standard.

(2) A compliance schedule, including the date each step toward compliance will be reached. Such list shall include as a minimum the following dates:

(i) Date by which contracts for emission control systems or process modifications will be awarded, or date by which orders will be issued for the purchase of component parts to accomplish emission control or process modification;

(ii) Date of initiation of onsite construction or installation of emission control equipment or process change;

(iii) Date by which onsite construction or installation of emission control equipment or process modification is to be completed; and

(iv) Date by which final compliance is to be achieved.

(3) A description of interim emission control steps which will be taken during the waiver period.

(c) Changes in the information provided under paragraph (a) of this section shall be provided to the Administrator within 30 days after such change, except that if changes will result from modification of the source, as defined in § 61.02 (j), the provisions of § 61.07 and § 61.08 are applicable.

(d) The format for reporting under this section is included as appendix A of this part. Advice on reporting the status of compliance may be obtained from the Administrator.

§ 61.11 Waiver of compliance.

(a) Based on the information provided in any request under § 61.10, or other information, the Administrator may grant a waiver of compliance with a standard for a period not exceeding 2 years from the effective date of such standard.

(b) Such waiver will be in writing and will:

(1) Identify the stationary source covered.

(2) Specify the termination date of the waiver. The waiver may be terminated at an earlier date if the conditions specified under paragraph (b)(3) of this section are not met.

(3) Specify dates by which steps toward compliance are to be taken; and impose such additional conditions as the Administrator determines to be necessary to assure installation of the necessary controls within the waiver period, and to assure protection of the health of persons during the waiver period.

(c) Prior to denying any request for a waiver pursuant to this section, the Administrator will notify the owner or operator making such request of the Administrator's intention to issue such denial, together with:

(1) Notice of the information and findings on which such intended denial is based, and

(2) Notice of opportunity for such owner or operator to present, within such time limit as the Administrator specifies, additional information or arguments to the Administrator prior to final action on such request.

(d) A final determination to deny any request for a waiver will be in writing and will set forth the specific grounds on which such denial is based. Such final determination will be made within 60 days after presentation of additional information or arguments, or 60 days after the final date specified for such presentation, if no presentation is made.

(e) The granting of a waiver under this section shall not abrogate the Administrator's authority under section 114 of the act.

§ 61.12 Emission tests and monitoring.

(a) Emission tests and monitoring shall be conducted and reported as set forth in this part and appendix B to this part.

(b) The owner or operator of a new source subject to this part, and at the request of the Administrator, the owner or operator of an existing source subject to this part, shall provide or cause to be provided, emission testing facilities as follows:

(1) Sampling ports adequate for test methods applicable to such source.

(2) Safe sampling platform(s).

(3) Safe access to sampling platform(s).

(4) Utilities for sampling and testing equipment.

§ 61.13 Waiver of emission tests.

(a) Emission tests may be waived upon written application to the Administrator if, in his judgment, the source is meeting the standard, or if the source is operating under a waiver of compliance or has requested a waiver of compliance.

(b) If application for waiver of the emission test is made, such application shall accompany the information required by § 61.10. The appropriate form is contained in appendix A to this part.

(c) Approval of any waiver granted pursuant to this section shall not abrogate the Administrator's authority under the act or in any way prohibit the Administrator from later canceling such waiver. Such cancellation will be made only after notice is given to the owner or operator of the source.

§ 61.14 Source test and analytical methods.

(a) Methods 101, 102, and 104 in appendix B to this part shall be used for all source tests required under this part, unless an equivalent method or an alternative method has been approved by the Administrator.

(b) Method 103 in appendix B to this part is hereby approved by the Administrator as an alternative method for sources subject to § 61.32(a) and § 61.42(b).

(c) The Administrator may, after notice to the owner or operator, withdraw approval of an alternative method granted under paragraph (a) or (b) of this section. Where the test results using an alternative method do not adequately indicate whether a source is in compliance with a standard, the Administrator may require the use of the reference method or its equivalent.

§ 61.15 Availability of information.

(a) Emission data provided to, or otherwise obtained by, the Administrator in accordance with the provisions of this part shall be available to the public.

(b) Any records, reports, or information, other than emission data, provided to, or otherwise obtained by, the Administrator in accordance with the provisions of this part shall be available to the public, except that upon a showing satisfactory to the Administrator by any person that such records, reports, or information, or particular part thereof (other than emission data), if made public, would divulge methods or processes entitled to protection as trade secrets of such person, the Administrator will consider such records, reports, or information, or particular part thereof, confidential in accordance with the purposes of section 1905 of title 18 of the United States Code, except that such records, reports, or information, or particular part thereof, may be disclosed to other officers, employees, or authorized representatives of the United States concerned with carrying out the provisions of the act or when relevant in any proceeding under the act.

§ 61.16 State authority.

(a) The provisions of this part shall not be construed in any manner to preclude any State or political subdivision thereof from:

(1) Adopting and enforcing any emission limiting regulation applicable to a stationary source, provided that such emission limiting regulation is not less stringent than the standards prescribed under this part.

(2) Requiring the owner or operator of a stationary source, other than a stationary source owned or operated by the United States, to obtain permits, licenses, or approvals prior to initiating construction, modification, or operation of such source.

Subpart B—National Emission Standard for Asbestos

§ 61.20 Applicability.

The provisions of this subpart are applicable to those sources specified in § 61.22.

§ 61.21 Definitions.

Terms used in this subpart are defined in the act, in subpart A of this part, or in this section as follows:

(a) "Asbestos" means actinolite, amosite, anthophyllite, chrysotile, crocidolite, tremolite.

(b) "Asbestos material" means asbestos or any material containing asbestos.

(c) "Particulate asbestos material" means finely divided particles of asbestos material.

(d) "Asbestos tailings" means any solid waste product of asbestos mining or milling operations which contains asbestos.

(e) "Outside air" means the air outside buildings and structures.

(f) "Visible emissions" means any emissions which are visually detectable without the aid of instruments and which contain particulate asbestos material.

§ 61.22 Emission standard.

(a) Asbestos mills: There shall be no visible emissions to the outside air from any asbestos mill except as provided in paragraph (f) of this section. Outside storage of asbestos materials is not considered a part of an asbestos mill.

(b) Roadways: The surfacing of roadways with asbestos tailings is prohibited, except for temporary roadways on an area of asbestos ore deposits. The deposition of asbestos tailings on roadways covered with snow or ice is considered "surfacing."

(c) Manufacturing: There shall be no visible emissions to the outside air, except as provided in paragraph (f) of this section, from any building or structure in which the following operations are conducted or directly from any of the following operations if they are conducted outside of buildings or structures.

(1) The manufacture of cloth, cord, wicks, tubing, tape, twine, rope, thread, yarn, roving, lap, or other textile materials.

(2) The manufacture of cement products.

(3) The manufacture of fireproofing and insulating materials.

(4) The manufacture of friction products.

(5) The manufacture of paper, millboard, and felt.

(6) The manufacture of floor tile.

(7) The manufacture of paints, coatings, caulks, adhesives, sealants.

(8) The manufacture of plastics and rubber materials.

(9) The manufacture of chlorine.

(d) Demolition: Any owner or operator of a demolition operation who intends to demolish any institutional, commercial, or industrial building (including apartment buildings having more than four dwelling units), structure, facility, installation, or portion thereof which contains any boiler, pipe, or load-supporting structural member that is insulated or fireproofed with friable asbestos material shall comply with the requirements set forth in this paragraph.

(1) Notice of intention to demolish shall be provided to the Administrator at least 20 days prior to commencement of such demolition or anytime prior to commencement of demolition subject to paragraph (d)(4) of this section.

Such notice shall include the following information:

(i) Name of owner or operator.

(ii) Address of owner or operator.

(iii) Description of the building, structure, facility, or installation to be demolished.

(iv) Address or location of the building, structure, facility or installation.

(v) Scheduled starting and completion dates of demolition.

(vi) Method of demolition to be employed.

(vii) Procedures to be employed to meet the requirements of this paragraph.

(2) The following procedures shall be used to prevent emissions of particulate asbestos material to outside air:

(i) Friable asbestos materials, used to insulate or fireproof any boiler, pipe, or load-supporting structural member, shall be wetted and removed from any building, structure, facility, or installation subject to this paragraph before wrecking of load-supporting structural members is commenced. The friable asbestos debris shall be wetted adequately to insure that such debris remains wet during all stages of demolition and related handling operations.

(ii) No pipe or load-supporting structural member that is covered with friable asbestos insulating or fireproofing material shall be dropped or thrown to the ground from any building, structure, facility, or installation subject to this paragraph, but shall be carefully lowered or taken to ground level.

(iii) No friable asbestos debris shall be dropped or thrown to the ground from any building, structure, facility, or installation subject to this paragraph or from any floor to any floor below. For buildings, structures, facilities, or installations, 50 feet or greater in height, friable asbestos debris shall be transported to the ground via dust-tight chutes or containers.

(3) Sources subject to this paragraph are exempt from the requirements of §§ 61.05(a), 61.07, and 61.09.

(4) Any owner or operator of a demolition operation who intends to demolish a building, structure, facility, or installation to which the provisions of this paragraph would be applicable but which has been declared by proper State or local authority to be structurally unsound and which is in danger of imminent collapse is exempt from the requirements of this paragraph other than the reporting requirements specified by paragraph (d)(1) of this section and the wetting of friable asbestos debris as specified by paragraph (d)(2)(i) of this section.

(e) *Spraying:* There shall be no visible emissions to the outside air from the spray-on application of materials containing more than 1 percent asbestos, on a dry weight basis, used to insulate or fireproof equipment and machinery, except as provided in paragraph (f) of this section. Spray-on materials used to insulate or fireproof buildings, structures, pipes, and conduits shall contain less than 1 percent asbestos on a dry weight basis.

(1) Sources subject to this paragraph are exempt from the requirements of § 61.05(a), § 61.07, and § 61.09.

(2) Any owner or operator who intends to spray asbestos materials to insulate or fireproof buildings, structures, pipes, conduits, equipment, and machinery shall report such intention to the administrator at least 20 days prior to the commencement of the spraying operation. Such report shall include the following information:

(i) Name of owner or operator.

(ii) Address of owner or operator.

(iii) Location of spraying operation.

(iv) Procedures to be followed to meet the requirements of this paragraph.

(f) Rather than meet the no-visible-emission requirements of paragraphs (a), (c), and (e) of this section, an owner or operator may elect to use the methods specified by § 61.23 to clean emissions containing particulate asbestos material before such emissions escape to, or are vented to, the outside air.

§ 61.23 Air-cleaning.

If air-cleaning is elected, as permitted by § 61.22(f), the requirements of this section must be met.

(a) Fabric filter collection devices must be used, except as noted in paragraphs (b) and (c) of this section. Such devices must be operated at a pressure drop of no more than 4 inches water gage, as measured across the filter fabric. The airflow permeability, as determined by ASTM method D737-69, must not exceed 30 $\text{ft}^3/\text{min}/\text{ft}^2$ for woven fabrics or 35 $\text{ft}^3/\text{min}/\text{ft}^2$ for felted fabrics, except that 40 $\text{ft}^3/\text{min}/\text{ft}^2$ for woven and 45 $\text{ft}^3/\text{min}/\text{ft}^2$ for felted fabrics is allowed for filtering air from asbestos ore dryers. Each square yard of felted fabric must weigh at least 14 ounces and be at least one-sixteenth inch thick throughout. Synthetic fabrics must not contain fill yarn other than that which is spun.

(b) If the use of fabric filters creates a fire or explosion hazard, the administrator may authorize the use of wet collectors designed to operate with a unit contacting energy of at least 40 inches water gage pressure.

(c) The administrator may authorize the use of filtering equipment other than that described in paragraphs (a) and (b) of this section if the owner or operator demonstrates to the satisfaction of the administrator that the filtering of particulate asbestos material is equivalent to that of the described equipment.

(d) All air-cleaning equipment authorized by this section must be properly installed, used, operated, and maintained. Bypass devices may be used only during upset or emergency conditions and then only for so long as it takes to shut down the operation generating the particulate asbestos material.

§ 61.24 Reporting.

The owner or operator of any existing source to which this subpart is applicable shall, within 90 days after the effective date, provide the following information to the administrator:

(a) A description of the emission control equipment used for each process;

(b) If a fabric filter device is used to control emissions, the pressure drop across the fabric filter in inches water gage.

(1) If the fabric filter device utilizes a woven fabric, the airflow permeability in $\text{ft}^3/\text{min}/\text{ft}^2$; and, if the fabric is synthetic, indicate whether the fill yarn is spun or not spun.

(2) If the fabric filter device utilizes a felted fabric, the density in oz/yd^2, the minimum thickness in inches, and the airflow permeability in $\text{ft}^3/\text{min}/\text{ft}^2$.

(c) Such information shall accompany the information required by § 61.10. The appropriate form is contained in appendix A to this part.

Subpart C—National Emission Standard for Beryllium

§ 61.30 Applicability.

The provisions of this subpart are applicable to the following stationary sources:

(a) Extraction plans, ceramic plants, foundries, incinerators, and propellant plants which process beryllium ore, beryllium, beryllium oxide, beryllium alloys, or beryllium-containing waste.

(b) Machine shops which process beryllium, beryllium oxides, or any alloy when such alloy contains more than 5 percent beryllium by weight.

§ 61.31 Definitions.

Terms used in this subpart are defined in the act, in subpart A of this part, or in this section as follows:

(a) "Beryllium" means the element beryllium. Where weights or concentrations are specified, such weights or concentrations apply to beryllium only, excluding the weight or concentration of any associated elements.

(b) "Extraction plant" means a facility chemically processing beryllium ore to beryllium metal, alloy, or oxide, or performing any of the intermediate steps in these processes.

(c) "Beryllium ore" means any naturally occurring material mined or gathered for its beryllium content.

(d) "Machine shop" means a facility performing cutting, grinding, turning, honing, milling, deburring, lapping, electrochemical machining, etching, or other similar operations.

(e) "Ceramic plant" means a manufacturing plant producing ceramic items.

(f) "Foundry" means a facility engaged in the melting or casting of beryllium metal or alloy.

(g) "Beryllium-containing waste" means material contaminated with beryllium and/or beryllium compounds used or generated during any process or operation performed by a source subject to this subpart.

(h) "Incinerator" means any furnace used in the process of burning waste for the primary purpose of reducing the volume of the waste by removing combustible matter.

(i) "Propellant" means a fuel and oxidizer physically or chemically combined which undergoes combustion to provide rocket propulsion.

(j) "Beryllium alloy" means any metal to which beryllium has been added in order to increase its beryllium content and which contains more than 0.1 percent beryllium by weight.

(k) "Propellant plant" means any facility engaged in the mixing, casting, or machining of propellant.

§ 61.32 Emission standard.

(a) Emissions to the atmosphere from stationary sources subject to the provisions of this subpart shall not exceed 10 grams of beryllium over a 24-hour period, except as provided in paragraph (b) of this section.

(b) Rather than meet the requirement of paragraph (a) of this section, an owner or operator may request approval from the Administrator to meet an ambient concentration limit on beryllium in the vicinity of the stationary source of 0.01 $\mu\text{g}/\text{m}^3$, averaged over a 30-day period.

(1) Approval of such requests may be granted by the Administrator provided that:

(i) At least 3 years of data is available which in the judgment of the Administrator demonstrates that the future ambient concentrations of beryllium in the vicinity of the stationary source will not exceed 0.01 $\mu\text{g}/\text{m}^3$, averaged over a 30-day period. Such 3-year period shall be the 3 years ending 30 days before the effective date of this standard.

(ii) The owner or operator requests such approval in writing within 30 days after the effective date of this standard.

(iii) The owner or operator submits a report to the Administrator within 45 days after the effective date of this standard which report includes the following information:

(*a*) Description of sampling method including the method and frequency of calibration.

(*b*) Method of sample analysis.

(*c*) Averaging technique for determining 30-day average concentrations.

(*d*) Number, identity, and location (address, coordinates, or distance and heading from plant) of sampling sites.

(*e*) Ground elevations and height above ground of sampling inlets.

(*f*) Plant and sampling area plots showing emission points and sampling sites. Topographic features significantly affecting dispersion including plant building heights and locations shall be included.

(*g*) Information necessary for estimating dispersion including stack height, inside diameter, exit gas temperature, exit velocity or flow rate, and beryllium concentration.

(*h*) A description of data and procedures (methods or models) used to design the air sampling network (i.e., number and location of sampling sites).

(i) Air sampling data indicating beryllium concentrations in the vicinity of the stationary source for the 3-year period specified in paragraph (b)(1) of this section. This data shall be presented chronologically and include the beryllium concentration and location of each individual sample taken by the network and the corresponding 30-day average beryllium concentrations.

(2) Within 60 days after receiving such report, the Administrator will notify the owner or operator in writing whether approval is granted or denied. Prior to denying approval to comply with the provisions of paragraph (b) of this section, the Administrator will consult with representatives of the stationary source for which the demonstration report was submitted.

(c) The burning of beryllium and/or beryllium-containing waste, except propellants, is prohibited except in incinerators, emissions from which must comply with the standard.

§ 61.33 Stack sampling.

(a) Unless a waiver of emission testing is obtained under § 61.13, each owner or operator required to comply with § 61.32(a) shall test emissions from his source,

(1) Within 90 days of the effective date in the case of an existing source or a new source which has an initial startup date preceding the effective date; or

(2) Within 90 days of startup in the case of a new source which did not have an initial startup date preceding the effective date.

(b) The Administrator shall be notified at least 30 days prior to an emission test so that he may at his option observe the test.

(c) Samples shall be taken over such a period or periods as are necessary to accurately determine the maximum emissions which will occur in any 24-hour period. Where emissions depend upon the relative frequency of operation of different types of processes, operating hours, operating capacities, or other factors, the calculation of maximum 24-hour-period emissions will be based on that combination of factors which is likely to occur during the subject period and which result in the maximum emissions. No changes in the operation shall be made, which would potentially increase emissions above that determined by the most recent source test, until a new emission level has been estimated by calculation and the results reported to the Administrator.

(d) All samples shall be analysed and beryllium emissions shall be determined within 30 days after the source test. All determinations shall be reported to the Administrator by a registered letter dispatched before the close of the next business day following such determination.

(e) Records of emission test results and other data needed to determine total emissions shall be retained at the source and made available, for inspection by the Administrator, for a minimum of 2 years.

§ 61.34 Air sampling.

(a) Stationary sources subject to § 61.32(b) shall locate air sampling sites in accordance with a plan approved by the Administrator. Such sites shall be located in such a manner as is calculated to detect maximum concentrations of beryllium in the ambient air.

(b) All monitoring sites shall be operated continuously except for a reasonable time allowance for instrument maintenance and calibration, for changing filters, or for replacemet of equipment needing major repair.

(c) Filters shall be analysed and concentrations calculated within 30 days after filters are collected. Records of concentrations at all sampling sites and other data needed to determine such concentrations shall be retained at the source and made available, for inspection by the Administrator, for a minimum of 2 years.

(d) Concentrations measured at all sampling sites shall be reported to the Administrator every 30 days by a registered letter.

(e) The Administrator may at any time require changes in, or expansion of, the sampling network.

Subpart D—National Emission Standard for Beryllium Rocket Motor Firing

§ 61.40 Applicability.

The provisions of this subpart are applicable to rocket motor test sites.

§ 61.41 Definitions.

Terms used in this subpart are defined in the Act, in Subpart A of this part, or in this section as follows:

(a) "Rocket motor test site" means any building, structure, facility, or installation where the static test firing of a beryllium rocket motor and/or the disposal of beryllium propellant is conducted.

(b) "Beryllium propellant" means any propellant incorporating beryllium.

§ 61.42 Emission standard.

(a) Emissions to the atmosphere from rocket-motor test sites shall not cause time-weighted atmospheric concentrations of beryllium to exceed 75 microgram minutes per cubic meter of air within the limits of 10 to 60 minutes, accumulated during any 2 consecutive weeks, in any area in which an effect adverse to public health could occur.

(b) If combustion products from the firing of beryllium propellant are collected in a closed tank, emissions from such tank shall not exceed 2 grams per hour and a maximum of 10 grams per day.

§ 61.43 Emission testing—rocket firing or propellant disposal.

(a) Ambient air concentrations shall be measured during and after firing of a rocket motor or propellant disposal and in such a manner that the effect of these emissions can be compared with the standard. Such sampling techniques shall be approved by the Administrator.

(b) All samples shall be analyzed and results shall be calculated within 30 days after samples are taken and before any subsequent rocket motor firing or propellant disposal at the given site. All results shall be reported to the Administrator by a registered letter dispatched before the close of the next business day following determination of such results.

(c) Records of air sampling test results and other data needed to determine integrated intermittent concentrations shall be retained at the source and made available, for inspection by the Administrator, for a minimum of 2 years.

(d) The Administrator shall be notified at least 30 days prior to an air sampling test, so that he may at his option observe the test.

§ 61.44 Stack sampling.

(a) Sources subject to § 61.42(b) shall be continuously sampled, during release of combustion products from the tank, in such a manner that compliance with the standards can be determined. The provisions of § 61.14 shall apply.

(b) All samples shall be analyzed, and beryllium emissions shall be determined within 30 days after samples are taken and before any subsequent rocket motor firing or propellant disposal at the given site. All determinations shall be reported to the Administrator by a registered letter dispatched before the close of the next business day following such determinations.

(c) Records of emission test results and other data needed to determine total emissions shall be retained at the source and made available, for inspection by the Administrator, for a minimum of 2 years.

(d) The Administrator shall be notified at least 30 days prior to an emission test, so that he may at his option observe the test.

Subpart E—National Emission Standard for Mercury

§ 61.50 Applicability.

The provisions of this subpart are applicable to those stationary sources which process mercury ore to recover mercury, and to those which use mercury chlor-alkali cells to produce chlorine gas and alkali metal hydroxide.

§ 61.51 Definitions.

Terms used in this subpart are defined in the act, in subpart A of this part, or in this section as follows:

(a) "Mercury" means the element mercury, excluding any associated elements, and includes mercury in particulates, vapors, aerosols, and compounds.

(b) "Mercury ore" means a mineral mined specifically for its mercury content.

(c) "Mercury ore processing facility" means a facility processing mercury ore to obtain mercury.

(d) "Condenser stack gases" mean the gaseous effluent evolved from the stack of processes utilizing heat to extract mercury metal from mercury ore.

(e) "Mercury chlor-alkali cell" means a device which is basically composed of an electrolyzer section and a denuder (decomposer) section and utilizes mercury to produce chlorine gas, hydrogen gas, and alkali metal hydroxide.

(f) "Mercury chlor-alkali electrolyzer" means an electrolytic device which is part of a mercury chlor-alkali cell and utilizes a flowing mercury cathode to produce chlorine gas and alkali metal amalgam.

(g) "Denuder" means a horizontal or vertical container which is part of a mercury chlor-alkali cell and in which water and alkali metal amalgam are converted to alkali metal hydroxide, mercury, and hydrogen gas in a short-circuited, electrolytic reaction.

(h) "Hydrogen gas stream" means a hydrogen stream formed in the chlor-alkali cell denuder.

(i) "End box" means a container(s) located on one or both ends of a mercury chlor-alkali electrolyzer which serves as a connection between the electrolyzer and denuder for rich and stripped amalgam.

(j) "End box ventilation system" means a ventilation system which collects mercury emissions from the end-boxes, the mercury pump sumps, and their water colection systems.

(k) "Cell room" means a structure(s) housing one or more mercury electrolytic chlor-alkali cells.

§ 61.52 Emission standard.

Emissions to the atmosphere from stationary sources subject to the provisions of this subpart shall not exceed 2,300 grams of mercury per 24-hour period.

§ 61.53 Stack sampling.

(a) Mercury ore processing facility.

(1) Unless a waiver of emission testing is obtained under § 61.13, each owner or operator processing mercury ore shall test emissions from his source,

(i) Within 90 days of the effective date in the case of an existing source or a new source which has an initial startup date preceding the effective date; or

(ii) Within 90 days of startup in the case of a new source which did not have an initial startup date preceding the effective date.

(2) The Administrator shall be notified at least 30 days prior to an emission test, so that he may at his option observe the test.

(3) Samples shall be taken over such a period or periods as are necessary to accurately determine the maximum emissions which will occur in a 24-hour period. No changes in the operation shall be made, which would potentially increase emissions above that determined by the most recent source test, until the new emission level has been estimated by calculation and the results reported to the Administrator.

(4) All samples shall be analyzed, and mercury emissions shall be determined within 30 days after the source test. Each determination will be reported to the Administrator by a registered letter dispatched before the close of the next business day following such determination.

(5) Records of emission test results and other data needed to determine total emissions shall be retained at the source and made available, for inspection by the Administrator, for a minimum of 2 years.

(b) Mercury chlor-alkali plant—hydrogen and end-box ventilation gas streams.

(1) Unless a waiver of emission testing is obtained under § 61.13, each owner or operator employing mercury chlor-alkali cell(s) shall test emissions from his source.

(i) Within 90 days of the effective date in the case of an existing source or a new source which has an initial startup date preceding the effective date; or

(ii) Within 90 days of startup in the case of a new source which did not have an initial startup date preceding the effective date.

(2) The Administrator shall be notified at least 30 days prior to an emission test, so that he may at his option observe the test.

(3) Samples shall be taken over such a period or periods as are necessary to accurately determine the maximum emissions which will occur in a 24-hour period. No changes in the operation shall be made, which would potentially increase emissions above that determined by the most recent source test, until the new emission has been estimated by calculation and the results reported to the Administrator.

(4) All samples shall be analysed and mercury emisions shall be determined within 30 days after the source test. All the determinations will be reported to the Administrator by a registered letter dispatched before the close of the next business day following such determination.

(5) Records of emission test results and other data needed to determine total emissions shall be retained at the source and made available, for inspection by the Administrator, for a minimum of 2 years.

(c) Mercury chlor-alkali plants—cell room ventilation system.

(1) Stationary sources using mercury chlor-alkali cells may test cell room emissions in accordance with paragraph (c)(2) of this section or demonstrate compliance with paragraph (c)(4) of this section and assume ventilation emissions of 1,300 gms/day of mercury.

(2) Unless a waiver of emission testing is obtained under § 61.13, each owner or operator shall pass all cell room air in forced gas streams through stacks suitable for testing,

(i) Within 90 days of the effective date in the case of an existing source or a new source which has an initial startup date preceding the effective date; or

(ii) Within 90 days of startup in the case of a new source which did not have an initial startup date preceding the effective date.

(3) The Administrator shall be notified at least 30 days prior to an emission test, so that he may at his option observe the test.

(4) An owner or operator may carry out approved design, maintenance, and housekeeping practices. A list of approved design, maintenance, and housekeeping practices may be obtained from the Administrator.

APPENDIX A

National Emission Standards for Hazardous Air Pollutants

Compliance Status Information

I. SOURCE REPORT

EPA USE ONLY
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19 28
AQCR RP CTY NDC 80

Instructions: Owners or operators of sources of hazardous pollutants subject to the National Emission Standards for Hazardous Air Pollutants are required to submit the information contained in Section I to the appropriate Environmental Protection Agency Regional Office before (date which is 90 days after the standards are promulgated). A listing of regional offices is provided in § 61.04.

A. SOURCE INFORMATION.

1. Identification/Location - Indicate the name and address of each source.

A29 A48
COMPANY NAME

A49 A68
NUMBER STREET ADDRESS

B19 B33
CITY

STATE

B34 B38
ZIP CODE

COUNTY

2. Contact - Indicate the name and telephone number of the owner or operator or other responsible official whom EPA may contact concerning this report.

B39 B53
NAME

B54 B63
TELEPHONE

2

3. Source Description - Briefly state the nature of the source (e.g., "Chlor-alkali Plant", or "Machine Shop").

C19 C43

4. Alternative Mailing Address - Indicate an alternative mailing address if correspondence is to be directed to a location different than that specified above.

C44 C63
NUMBER STREET ADDRESS

C64 C77 CITY
C78 C79 STATE
D75 D79 ZIP CODE

5. Compliance Status - The emissions from this source can cannot meet the emission limitations contained in the National Emission Standards on or before (date which is 90 days after the promulgation of the standards).

Signature of owner, operator or other responsible official

NOTE: If the emissions from the source will exceed these limits set by the National Emission Standards for Hazardous Air Pollutants, the source will be in violation and subject to Federal enforcement actions unless granted a waiver of compliance by the Administrator of the Environmental Protection Agency. The information needed for such waivers is listed in Section II of this form.

- -

EPA USE ONLY G14 G15 EP G46 G53 SCC

B. PROCESS INFORMATION. Part B should be completed separately for each point of emission for each hazardous pollutant.

3

1. Process Description - Provide a brief description of each process (e.g., "hydrogen end box" in a mercury chlor-alkali plant, "grinding machine" in a beryllium machine shop). Use additional sheets if necessary.

G21 G45

2. Pollutant Emitted - Indicate the type of hazardous pollutant emitted by the process. Indicate "AB" for asbestos, "BE" for beryllium, or "HG" for mercury.

G19 G20

3. Amount of Pollutant - Indicate the average weight of the hazardous material named in item 2 which enters the process in pounds per month (based on the previous twelve months of operation).

G54 G60

4. Control Devices

a. Indicate the type of pollution control devices, if any, used to reduce the emissions from the process (e.g., venturi scrubber, baghouse, wet cyclone) and the estimated percent of the pollutant which the device removes from the process gas stream.

H19 H34 PRIMARY CONTROL DEVICE TYPE
H51 H53 PERCENT REMOVAL EFFICIENCY

H35 H50 SECONDARY CONTROL DEVICE TYPE
H54 H56 PERCENT REMOVAL EFFICIENCY

b. Asbestos Emission Control Devices Only

1. If a baghouse is specified in item 4a give the following information:

- The air flow permeability in cubic feet per minute per square foot of fabric area:

Air flow permeability = ______________ cfm/ft^2

- The pressure drop in inches water gauge across the filter at which the baghouse is operated

Operating pressure drop = __________ inches w.g.

- If the baghouse material contains synthetic fill yarn, check whether this material is spun ☐ or not spun ☐.

If the baghouse utilizes a felted fabric, give the minimum thickness in inches and the density in ounces per square yard.

Thickness = ________ inches Density = ________ oz/yd^2

11. If a wet collection device is specified in item 4a, give the designed unit contacting energy in inches water gauge.

Unit contacting energy = ________ inches w.g.

EPA USE ONLY
157
CC ☐

II. WAIVER REQUESTS

EPA USE ONLY
1 ... 13
R S C SC

A. **WAIVER OF COMPLIANCE.** Owners or operators of sources unable to operate in compliance with the National Emission Standards for Hazardous Air Pollutants by (date which is 90 days after the standards are promulgated) may request a waiver of compliance from the Administrator of the Environmental Protection Agency for the time period necessary to install appropriate control devices or make modifications to achieve compliance. The Administrator may grant a waiver of compliance with the standard for a period not exceeding two years from the effective date of the hazardous pollutant standards if he finds that such period is necessary for the installation of controls and that steps will be taken during the period of the waiver to assure that the health of persons will be protected from imminent endangerment.

The reporting information provided in Section I must accompany this application. Applications should be sent to the appropriate EPA regional office.

1. Processes Involved - Indicate the process or processes emitting hazardous pollutants to which emission controls are to be applied.

____

____

2. Controls

a. Describe the proposed type of control device to be added or modification to be made to the process to reduce the emissions of hazardous pollutants to an acceptable level. Use additional sheets if necessary.

____

____

____

b. Describe the measures that will be taken during the waiver period to assure that the health of persons will be protected from imminent endangerment. Use additional sheets if necessary.

____

____

____

3. Increments of Progress - specify the dates by which the following increments of progress will be met.

Date by which contracts for emission control systems or process modifications will be awarded; or date by which orders will be issued for the purchase of the component parts to accomplish emission control or process modification.

LSB ⌊ . ⌋ ⌊ . ⌋ ⌊ . ⌋ LSB 01
MONTH DAY YEAR

Date of initiation of on-site construction or installation of emission control equipment or process change.

LSB ⌊ . ⌋ ⌊ . ⌋ ⌊ . ⌋ LSB 02
MONTH DAY YEAR

Date by which on-site construction or installation of emission control equipment or process modification is to be completed.

156 ☐ ☐ ☐ 159 03
MONTH DAY YEAR

Date by which final compliance is to be achieved.

156 ☐ ☐ ☐ 159 04
MONTH DAY YEAR

Signature of owner or operator

- -

B. WAIVER OF EMISSION TESTS. A waiver of emission testing may be granted to owners or operators of sources of beryllium or mercury pollutants if, in the judgment of the Administrator of the Environmental Protection Agency the emissions from the source comply with the appropriate standard or if the owners or operators of the source have requested a waiver of compliance or have been granted a waiver of compliance.

This application should accompany the reporting information provided in Section I.

1. Reason - State the reasons for requesting a waiver of emission testing. If the reason stated is that the emissions from the source is within the prescribed limits, documentation of this condition must be attached.

____

____

Date

Signature of the owner or operator

APPENDIX B—TEST METHODS

METHOD 101. REFERENCE METHOD FOR DETERMINATION OF PARTICULATE AND GASEOUS MERCURY EMISSIONS FROM STATIONARY SOURCES (AIR STREAMS)

1. *Principle and applicability*—1.1 *Principle.* Particulate and gaseous mercury emissions are isokinetically sampled from the source and collected in acidic iodine monochloride solution. The mercury collected (in the mercuric form) is reduced to elemental mercury in basic solution by hydroxylamine sulfate. Mercury is aerated from the solution and analyzed using spectrophotometry.

1.2 *Applicability.* This method is applicable for the determination of particulate and gaseous mercury emissions when the carrier gas stream is principally air. The method is for use in ducts or stacks at stationary sources. Unless otherwise specified, this method is not intended to apply to gas streams other than those emitted directly to the atmosphere without further processing.

2. *Apparatus*—2.1 *Sampling train.* A schematic of the sampling train used by EPA is shown in figure 101–1. Commercial models of this train are available, although construction details are described in APTD-0581,[1] and operating and maintenance procedures are described in APTD-0576. The components essential to this sampling train are the following:

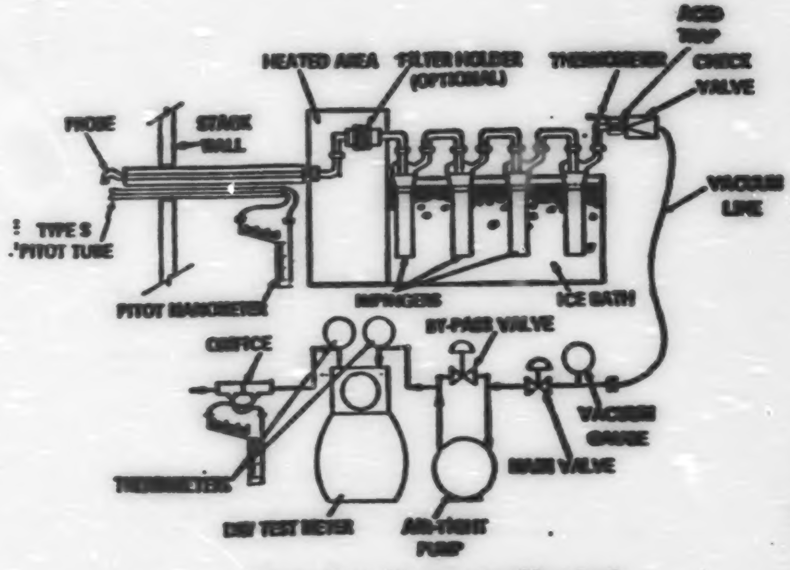

Figure 101-1. Mercury sampling train

2.1.1 *Nozzle.* Stainless steel or glass with sharp, tapered leading edge.

2.1.2 *Probe.* Sheathed Pyrex[2] glass. A heating system capable of maintaining a minimum gas temperature of 250° F at the probe outlet during sampling may be used to prevent condensation from occurring.

2.1.3 *Pitot tube.* Type S (Figure 101–2), or equivalent, with a coefficient within 5 percent over the working range, attached to probe to monitor stack gas velocity.

2.1.4 *Impingers.* Four Greenburg-Smith impingers connected in series with glass ball joint fittings. The first, third, and fourth impingers may be modified by replacing the tip with a one-half inch ID glass tube extending to one-half inch from the bottom of the flask.

2.1.5 *Acid Trap.* Mine Safety Appliances Air Line Filter, Catalogue Number 81857, with acid absorbing cartridge and suitable connections, or equivalent.

2.1.6 *Metering system.* Vacuum gauge, leakless pump, thermometers capable of measuring temperature to within 5° F, dry gas meter with 2 percent accuracy, and related equipment, described in APTD-0581, to maintain an isokinetic sampling rate and to determine sample volume.

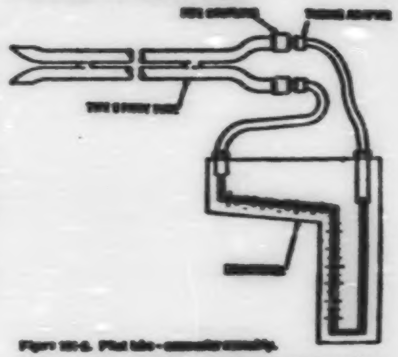

Figure 101-2. Pitot tube-manometer assembly.

2.1.7 *Filter Holder* (optional)–*Pyrex glass.* A filter may be used in cases where the gas stream to be sampled contains large quantities of particulate matter. The filter holder must provide a positive seal against leakage from outside or around the filter. A heating system capable of maintaining the filter at a minimum temperature of 250° F. should be used to prevent condensation from occurring.

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[1] These documents are available for a nominal cost from the National Technical Information Service, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Va. 22151.

[2] Mention of trade names or specific products does not constitute endorsement by the Environmental Protection Agency.

2.1.8 *Barometer*. To measure atmospheric pressure to ±0.1 in Hg.

2.2 *Measurement of stack conditions (stack pressure, temperature, moisture and velocity)*—2.2.1 *Pitot tube*. Type S, or equivalent, with a coefficient within 5 percent over the working range.

2.2.2 *Differential pressure gauge*. Inclined manometer, or equivalent, to measure velocity held to within 10 percent of the minimum value. Micromanometers should be used if warranted.

2.2.3 *Temperature gauge*. Any temperature measuring device to measure stack temperature to within 1° F.

2.2.4 *Pressure gauge*. Pitot tube and inclined manometer, or equivalent, to measure stack pressure to within 0.1 in Hg.

2.2.5 *Moisture determination*. Wet and dry bulb thermometers, drying tubes, condensers, or equivalent, to determine stack gas moisture content to within 1 percent.

2.3 *Sample recovery*—2.3.1 *Leakless glass sample bottles*. 500 ml and 100 ml with Teflon lined tops.

2.3.2 *Graduated cylinder*. 250 ml.

2.3.3 *Plastic jar*. Approximately 300 ml.

2.4 *Analysis*—2.4.1 *Spectrophotometer*. To measure absorbance at 253.7 nm. Perkin Elmer Model 303, with a cylindrical gas cell (approximately 1.5 in. O.D. x 7 in.) with quartz glass windows, and hollow cathode source, or equivalent.

2.4.2 *Gas sampling bubbler*. Tudor Scientific Glass Co., Smog Bubbler, Catalogue No. TP-1150, or equivalent.

2.4.3. *Recorder*. To match output of spectrophotometer.

3. *Reagents*—3.1 *Stock reagents*—3.1.1 *Potassium iodide*. Reagent grade.

3.1.2 *Distilled water*—3.1.3 *Potassium iodide solution, 25 percent*. Dissolve 250 g of potassium iodide (reagent 3.1.1) in distilled water and dilute to 1 to 1.

3.1.4 *Hydrochloric acid*. Concentrated.

3.1.5. *Potassium iodate*. Reagent grade.

3.1.6 *Iodine monochloride (ICl) 1.0M*. To 800 ml. of 25% potassium iodide solution (reagent 3.1.3), add 800 ml. of concentrated hydrochloric acid. Cool to room temperature. With vigorous stirring, slowly add 135 g. of potassium iodate and continue stirring until all free iodine has dissolved to give a clear orange-red solution. Cool to room temperature and dilute to 1800 ml. with distilled water. The solution should be kept in amber bottles to prevent degradation.

3.1.7 *Sodium hydroxide pellets*. Reagent grade.

3.1.8 *Nitric acid*. Concentrated.

3.1.9 *Hydroxylamine sulfate*. Reagent grade.

3.1.10 *Sodium chloride*. Reagent grade.

3.1.11 *Mercuric chloride*. Reagent grade.

3.2 *Sampling*—3.2.1 *Absorbing solution, 0.1M ICl*. Dilute 100 ml. of the 1.0M ICl stock solution (reagent 3.1.6) to 1 to 1 with distilled water. The solution should be kept in glass bottles to prevent degradation. This reagent should be stable for at least 2 months; however, periodic checks should be performed to insure quality.

3.2.2 *Wash acid*. 1:1 V/V nitric acid—water.

3.2.3 *Distilled, deionized water*.

3.2.4 *Silica gel*. Indicating type, 6 to 16 mesh dried at 350° F. for 2 hours.

3.2.5 *Filter (optional)*. Glass fiber, Mine Safety Appliances 1106BH, or equivalent. A filter may be necessary in cases where the gas stream to be sampled contains large quantities of particulate matter.

3.3 *Analysis*—3.3.1 *Sodium hydroxide, 10 N.*—Dissolve 400 g of sodium hydroxide pellets in distilled water and dilute to 1 to 1.

3.3.2 *Reducing agent, 12 percent hydroxylamine sulfate, 12 percent sodium chloride.*—To 60 ml of distilled water, add 12 g of hydroxylamine sulfate and 12 g of sodium chloride. Dilute to 100 ml. This quantity is sufficient for 20 analyses and must be prepared daily.

3.3.3 *Aeration gas.*—Zero grade air.

3.3.4 *Hydrochloric acid, 0.2N.*—Dilute 16.5 ml of concentrated hydrochloric acid to 1 to 1 with distilled water.

3.4 *Standard mercury solutions*—3.4.1 *Stock solution.*—Add 0.1354 g of mercuric chloride to 80 ml of 0.2N hydrochloric acid. After the mercuric chloride has dissolved, add 0.2N hydrochloric acid and adjust the volume to 100 ml. One ml of this solution is equivalent to 1 mg of free mercury.

3.4.2 *Standard solutions.*—Prepare calibration solutions by serially diluting the stock solution (3.4.1) with 0.2N hydrochloric acid. Prepare solutions at concentrations in the linear working range for the instrument to be used. Soutions of 0.2 μg/ml, 0.4 μg/ml and 0.6 μg/ml have been found acceptable for most instruments. Store all solutions in glass-stoppered, glass bottles. These solutions should be stable for at least 2 months; however, periodic checks should be performed to insure quality.

4. *Procedure.*—4.1 Guidelines for source testing are detailed in the following sections. These guidelines are generally applicable; however, most sample sites differ to some degree and temporary alterations such as stack extensions or expansions often are required to ensure the best possible sample site. Further, since mercury is hazardous, care should be taken to minimize exposure. Finally, since the total quantity of mercury to be collected generally is small, the test must be carefully conducted to prevent contamination or loss of sample.

4.2 Selection of a sampling site and minimum number of traverse points:

4.2.1 Select a suitable sampling site that is as close as is practicable to the point of atmospheric emission. If possible, stacks smaller than 1 foot in diameter should not be sampled.

4.2.2 The sampling site should be at least eight stack or duct diameters downstream and two diameters upstream from any flow disturbance such as a bend, expansion, or contraction. For a rectangular cross section, determine an equivalent diameter from the following equation:

$$D_e = \frac{2LW}{L+W} \qquad \text{eq. 101 1}$$

where:

D_e = Equivalent diameter.

L = Length.

W = Width.

4.2.3 When the above sampling site criteria can be met, the minimum number of traverse points is four (4) for stacks 1 foot in diameter or less, eight (8) for stacks larger than 1 foot but 2 feet in diameter or less, and twelve (12) for stacks larger than 2 feet.

4.2.4 Some sampling situations may render the above sampling site criteria impractical. When this is the case, choose a convenient sampling location and use figure 101–3 to determine the minimum number of traverse points. However, use figure 101–3 only for stacks 1 foot in diameter or larger.

4.2.5 To use figure 101–3, first measure the distance from the chosen sampling location to the nearest upstream and downstream disturbances. Divide this distance by the diameter or equivalent diameter to determine the distance in terms of pipe diameters. Determine the corresponding number of traverse points for each distance from figure 101–3. Select the higher of the two numbers of traverse points, or a greater value, such that for circular stacks the number is a multiple of four, and for rectangular stacks the number follows the criteria of section 4.2.2.

4.2.6 If a selected sampling point is closer than 1 inch from the stack wall, adjust the location of that point to ensure that the sample is taken at least 1 inch away from the wall.

4.3 Cross sectional layout and location of traverse points:

4.3.1 For circular stacks locate the traverse points on at least two diameters according to figure 101–4 and table 101–1. The traverse axes shall divide the stack cross section into equal parts.

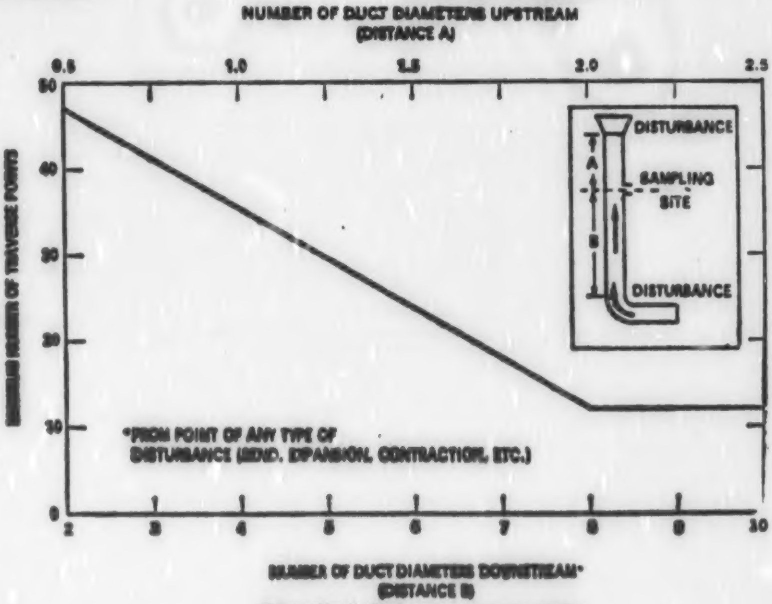

Figure 102–3. Minimum of traverse points.

Table 101-1. Location of traverse points in circular stacks
(Percent of stack diameter from inside wall to traverse point)

Traverse point number on a diameter	Number of traverse points on a diameter											
	2	4	6	8	10	12	14	16	18	20	22	24
1	14.6	6.7	4.4	3.3	2.5	2.1	1.8	1.6	1.4	1.3	1.1	1.1
2	85.4	25.0	14.7	10.5	8.2	6.7	5.7	4.9	4.4	3.9	3.5	3.2
3		75.0	29.5	19.4	14.6	11.8	9.9	8.5	7.5	6.7	6.0	5.5
4		93.3	70.5	32.3	22.6	17.7	14.6	12.5	10.9	9.7	8.7	7.9
5			85.3	67.7	34.2	25.0	20.1	16.9	14.6	12.9	11.6	10.5
6			95.6	80.6	65.8	35.5	26.9	22.0	18.8	16.5	14.6	13.2
7				89.5	77.4	64.5	36.6	28.3	23.6	20.4	18.0	16.1
8				96.7	85.4	75.0	63.4	37.5	29.6	25.0	21.8	19.4
9					91.8	82.3	73.1	62.5	38.2	30.6	26.1	23.0
10					97.5	88.2	79.9	71.7	61.8	38.8	31.5	27.2
11						93.3	85.4	78.0	70.4	61.2	39.3	32.3
12						97.9	90.1	83.1	76.4	69.4	60.7	39.8
13							94.3	87.5	81.2	75.0	68.5	60.2
14							98.2	91.5	85.4	79.6	73.9	67.7
15								95.1	89.1	83.5	78.2	72.8
16								98.4	92.5	87.1	82.0	77.0
17									95.6	90.3	85.4	80.6
18									98.6	93.3	88.4	83.9
19										96.1	91.3	86.8
20										98.7	94.0	89.5
21											96.5	92.1
22											98.9	94.5
23												96.8
24												98.9

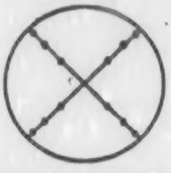

Figure 101-4. Cross section of circular stack showing location of traverse points on perpendicular diameters.

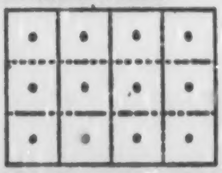

Figure 101-5. Cross section of rectangular stack divided into 12 equal areas, with traverse points at centroid of each area.

4.3.2 For rectangular stacks divide the cross section into as many equal rectangular areas as traverse points, such that the ratio of the length to the width of the elemental areas is between one and two. Locate the traverse points at the centroid of each equal area according to figure 101-5.

4.4 Measurement of stack conditions:

4.4.1 Set up the apparatus as shown in figure 101-2. Make sure all connections are tight and leak-free. Measure the velocity head and temperature at the traverse points specified by section 4.2 and 4.3.

4.4.2 Measure the static pressure in the stack.

4.4.3 Determine the stack gas moisture.

4.4.4 Determine the stack gas molecular weight from the measured moisture content and knowledge of the expected gas stream composition. A standard Orsat analyzer has been found valuable at combustion sources. In all cases, sound engineering judgment should be used.

4.5 Preparation of sampling train:

4.5.1 Prior to assembly, clean all glassware (probe, impingers, and connectors) by rinsing with wash acid, tap water, 0.1M ICl, tap water, and finally distilled water. Place 100 ml of 0.1M ICl in each of the first three impingers, and place approximately 200 g of preweighed silica gel in the fourth impinger. Save 80 ml of the 0.1M ICl as a blank in the sample analysis. Set up the train and the probe as in figure 101-1.

4.5.2 If the gas stream to be sampled is excessively dirty or moist, the first impinger may clog or become dilute too rapidly for sufficient testing. A filter can be placed ahead of the impingers to collect the particulates. An initial empty impinger may also be used to remove excess moisture. If a fifth impinger is required, the final impinger may have to be carefully taped to the outside of the sample box.

4.5.3 Leak check the sampling train at the sampling site. The leakage rate should not be in excess of 1 percent of the desired sampling rate. If condensation in the probe or filter is a problem, probe and filter heaters will be required. Adjust the heaters to provide a temperature of at least 250° F. Place crushed ice around the impingers. Add more ice during the test to keep the temperature of the gases leaving the last impinger at 70° F or less.

4.6 Mercury train operation:

4.6.1 For each run, record the data required on the example sheet shown in figure 101-6. Take readings at each sampling point at least every 5 minutes and when significant changes in stack conditions necessitate additional adjustments in flow rate.

4.6.2 Sample at a rate of 0.5 to 1.0 cfm. Samples shall be taken over such a period or periods as are necessary to accurately determine the maximum emissions which would occur in a 24-hour period. In the case of cyclic operations, sufficient tests shall be made so as to allow accurate determination or calculation of the emissions which will occur over the duration of the cycle. A minimum sample time of 2 hours is recommended. In some instances, high mercury concentrations can prevent sampling in one run for the desired minimum time. This is indicated by reddening in the first impinger as free iodine is liberated. In this case, a run may be divided into two or more subruns to ensure that the absorbing solutions are not depleted.

PLANT ____________
LOCATION ____________
OPERATOR ____________
DATE ____________
RUN NO. ____________
SAMPLE BOX NO. ____________
METER BOX NO. ____________
METER ΔH@ ____________
C FACTOR ____________

SCHEMATIC OF STACK CROSS SECTION

AMBIENT TEMPERATURE ____________
BAROMETRIC PRESSURE ____________
ASSUMED MOISTURE, % ____________
HEATER BOX SETTING ____________
PROBE LENGTH, m. ____________
NOZZLE DIAMETER, in. ____________
PROBE HEATER SETTING ____________

TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	STATIC PRESSURE (P_s), in. Hg	STACK TEMPERATURE (T_s), °F	VELOCITY HEAD (ΔP_s)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH), in. H_2O	GAS SAMPLE VOLUME (V_m), ft³	GAS SAMPLE TEMPERATURE AT DRY GAS METER		SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
							INLET ($T_{m_{in}}$), °F	OUTLET ($T_{m_{out}}$), °F		
TOTAL							Avg.	Avg.		
AVERAGE							Avg.			

Figure 101-6. Field data

4.6.3 To begin sampling, position the nozzle at the first traverse point with the tip pointing directly into the gas stream. Immediately start the pump and adjust the flow to isokinetic conditions. Sample for at least 5 minutes at each traverse point; sampling time must be the same for each point. Maintain isokinetic sampling throughout the sampling period. Nomographs which aid in the rapid adjustment of the sampling rate without other computations are in APTD-0576 and are available from commercial suppliers. Note the standard nomographs are applicable only for type S pitot tubes and air or a stack gas with an equivalent density. Contact EPA or the sampling train supplier for instructions when the standard nomograph is not applicable.

4.6.4 Turn off the pump at the conclusion of each run and record the final readings. Immediately remove the probe and nozzle from the stack and handle in accordance with the sample recovery process described in section 4.7.

4.7 Sample recovery:

4.7.1 (All glass storage bottles and the graduated cylinder must be precleaned as in section 4.5.1). This operation should be performed in an area free of possible mercury contamination. Industrial laboratories and ambient air around mercury-using facilities are not normally free of mercury contamination. When the sampling train is moved, care must be exercised to prevent breakage and contamination.

4.7.2 Disconnect the probe from the impinger train. Place the contents (measured to ±1 ml) of the first three impingers into a 500 ml sample bottle. Rinse the probe and all glassware between it and the back half of the third impinger with two 50 ml portions of 0.1M ICl solution. Add these rinses to the first sample bottle. For a blank, place 50 ml of the 0.1M ICl in a 100 ml sample bottle. If used, place the filter along with 100 ml of 0.1M ICl in another 100 ml sample bottle. Retain a filter blank. Place the silica gel in the plastic jar. Seal and secure all containers for shipment. If an additional test is desired, the glassware can be carefully double rinsed with distilled water and reassembled. However, if the glassware is to be out of use more than 2 days, the initial acid wash procedure must be followed.

4.8 Analysis:

4.8.1 *Apparatus preparation.*—Clean all glassware according to the procedure of section 4.5.1. Adjust the instrument settings according to the instrument manual, using an absorption wavelength of 253.7 nm.

4.8.2 *Analysis preparation.*—Adjust the air delivery pressure and the needle valve to obtain a constant airflow of about 1.3 to 1/min. The analysis tube should be bypassed except during aeration. Purge the equipment for 2 minutes. Prepare a sample of mercury standard solution (3.4.2) according to section 4.8.3. Place the analysis tube in the line, and aerate until a maximum peak height is reached on the recorder. Remove the analysis tube, flush the lines, and rinse the analysis tube with distilled water. Repeat with another sample of the same standard solution. This purge and analysis cycle is to be repeated until peak heights are reproducible.

4.8.3 *Sample preparation.*—Just prior to analysis, transfer a sample aliquot of up to 50 ml to the cleaned 100 ml analysis tube. Adjust the volume to 50 ml with 0.1M ICl if required. Add 5 ml of 10 N sodium hydroxide, cap tube with a clean glass stopper and shake vigorously. Prolonged, vigorous shaking at this point is necessary to obtain an accurate analysis. Add 5 ml of the reducing agent (reagent 3.3.2), cap tube with a clean glass stopper and shake vigorously and immediately in sample line.

4.8.4 *Mercury determination.*—After the system has been stabilized, prepare samples from the sample bottle according to section 4.8.3. Aerate the sample until a maximum peak height is reached on the recorder. The mercury content is determined by comparing the peak heights of the samples to the peak heights of the calibration solutions. If collected samples are out of the linear range, the samples should be diluted. Prepare a blank from the 100 ml bottle according to section 4.8.3 and analyze to determine the reagent blank mercury level.

5. *Calibration.*—5.1 *Sampling train.*—5.1.1 Use standard methods and equipment as detailed in APTD-0576 to calibrate the rate meter, pitot tube, dry gas meter, and probe heater (if used). Recalibrate prior to each test series.

5.2 *Analysis.*—5.2.1 Prepare a calibration curve for the spectrophotometer using the standard mercury solutions. Plot the peak heights read on the recorder versus the concentrations of mercury in the standard solutions. Standards should be interspersed with the samples since the calibration can change slightly with time. A new calibration curve should be prepared for each new set of samples run.

6. *Calculations.*—6.1 Average dry gas meter temperature, stack temperature, stack pressure and average orifice pressure drop. See data sheet (fig. 101-6).

6.2 *Dry gas volume.*—Correct the sample volume measured by the dry gas meter to stack conditions by using equation 101-2.

$$V_{m_s} = V_m \frac{T_s}{T_m} \frac{\left(P_{bar} + \frac{\Delta H}{13.6}\right)}{P_s} \qquad \text{eq 101-2}$$

where:

V_{m_s} = Volume of gas sample through the dry gas meter (stack conditions), ft³.
V_m = Volume of gas sample through the dry gas meter (meter conditions), ft³.
T_s = Average temperature of stack gas, °R.
T_m = Average dry gas meter temperature, °R.
P_{bar} = Barometric pressure at the orifice meter, inHg.
ΔH = Average pressure drop across the orifice meter, inH_2O.
13.6 = Specific gravity of mercury.
P_s = Stack pressure, P_{bar} ± static pressure, inHg.

6.3 *Volume of water vapor.*

$$Vw_s = K_w V_{l_c} \frac{T_s}{P_s} \qquad \text{eq. 101-3}$$

where:

Vw_s = Volume of water vapor in the gas sample (stack conditions), ft³.

$K_w = 0.00267 \frac{\text{in. Hg-ft}^3}{\text{ml.-}^\circ\text{R}}$, when these units are used.

V_{l_c} = Total volume of liquid collected in impingers and silica gel (see figure 101-7), ml.

T_s = Average stack gas temperature, °R.

P_s = Stack pressure, P_{bar} ± static pressure, in. Hg.

6.4 Total gas volume.

$$V_{total} = V_{m_s} + Vw_s \qquad \text{eq. 101-4}$$

where:

V_{total} = Total volume of gas sample (stack conditions), ft³.

V_{m_s} = Volume of gas through gas meter (stack conditions), ft³.

Vw_s = Volume of water vapor in gas sample (stack conditions), ft³.

	VOLUME OF LIQUID WATER COLLECTED		
	IMPINGER VOLUME, ml	SILICA GEL WEIGHT, g	
FINAL			
INITIAL			
LIQUID COLLECTED			
TOTAL VOLUME COLLECTED		g*	ml

*CONVERT WEIGHT OF WATER TO VOLUME BY dividing total weight INCREASE BY DENSITY OF WATER. (1 g/ml):

$$\frac{\text{INCREASE, g}}{(1\ \text{g/ml})} = \text{VOLUME WATER, ml}$$

Figure 101-7. Analytical data.

6.5 Stack gas velocity. Use equation 101-5 to calculate the stack gas velocity.

$$(v_s)_{avg.} = K_p C_p (\sqrt{\Delta P})_{avg.} \sqrt{\frac{(T_s)_{avg.}}{P_s M_s}} \qquad \text{eq. 101-5}$$

where:

$(v_s)_{avg.}$ = Average stack gas velocity, feet per second.

$K_p = 85.53 \frac{\text{ft.}}{\text{sec.}} \left(\frac{\text{lb.-in. Hg}}{\text{lb. mole-}^\circ\text{R-in. H}_2\text{O}}\right)^{1/2}$, when these units are used.

C_p = Pitot tube coefficient, dimensionless.

$(T_s)_{avg.}$ = Average stack gas temperature, °R.

$(\sqrt{\Delta P})_{avg.}$ = Average square root of the velocity head of stack gas (in. H_2O)$^{1/2}$ (see fig. 101-8).

P_s = Stack pressure, P_{bar} ± static pressure, in. Hg.

M_s = Molecular weight of stack gas (wet basis), the summation of the products of the molecular weight of each component multiplied by its volumetric proportion in the mixture, lb./lb. mole.

Figure 101-8 shows a sample recording sheet for velocity traverse data. Use the averages in the last two columns of figure 101-8 to determine the average stack gas velocity from equation 101-5.

6.6 Mercury collected. Calculate the total weight of mercury collected by using equation 101-6.

$$W_t = V_t C_t - V_b C_b \ (+V_f C_f) \ldots \text{eq. 101-6}$$

where:

W_t = total weight of mercury collected, μg.

PLANT______________________

DATE______________________

RUN NO.______________________

STACK DIAMETER, in.__________________

BAROMETRIC PRESSURE, in. Hg.______________

STATIC PRESSURE IN STACK (P_g), in. Hg.__________

OPERATORS______________________

SCHEMATIC OF STACK CROSS SECTION

Traverse point number	Velocity head, in. H_2O	$\sqrt{\Delta_p}$	Stack Temperature (T_s), °F
	AVERAGE:		

Figure 101-8. Velocity traverse data.

V_s = Total volume of condensed moisture and ICl in sample bottle, ml.

C_s = Concentration of mercury measured in sample bottle, $\mu g/ml$.

V_b = Total volume of ICl used in sampling (impinger contents and all wash amounts), ml.

C_b = Blank concentration of mercury in ICl solution, $\mu g/ml$.

V_f = Total volume of ICl used in filter bottle (if used), ml.

C_f = Concentration of mercury in filter bottle (if used), $\mu g/ml$.

6.7 Total mercury emission. Calculate the total amount of mercury emitted from each stack per day by equation 101-7. This equation is applicable for continuous operations. For cyclic operations, use only the time per day each stack is in operation. The total mercury emissions from a source will be the summation of results from all stacks.

$$R = \frac{W_t (v_s)_{avg} A_s}{V_{total}} \times \frac{86,400 \text{ seconds/day}}{10^6 \ \mu g/g} \qquad \text{eq. 101-7}$$

where:

R = Rate of emission, g/day.

W_t = Total weight of mercury collected, μg.

V_{total} = Total volume of gas sample (stack conditions), ft^3.

$(v_s)_{avg}$ = Average stack gas velocity, feet per second.

A_s = Stack area, ft^2.

6.8 Isokinetic variation (comparison of velocity of gas in probe tip to stack velocity).

$$I = \frac{100 V_{total}}{A_n \Theta (v_s)_{avg}} \qquad \text{eq. 101-8}$$

where:

I = Percent of isokinetic sampling.

V_{total} = Total volume of gas sample (stack conditions), ft^3.

A_n = Probe tip area, ft^2.

Θ = Sampling time, sec.

$(v_s)_{avg}$ = Average stack gas velocity, feet per second.

7. *Evaluation of results*—7.1 *Determination of compliance*.—7.1.1 Each performance test shall consist of three repetitions of the applicable test method. For the purpose of determining compliance with an applicable national emission standard, the average of results of all repetitions shall apply.

7.2 *Acceptable isokinetic results*.—7.2.1 The following range sets the limit on acceptable isokinetic sampling results:

If $90\% \leq I \leq 110\%$, the results are acceptable; otherwise, reject the test and repeat.

8. *References*.—

1. Addendum to Specifications for Incinerator Testing at Federal Facilities, PHS, NCAPC, Dec. 6, 1967.

2. Determining Dust Concentration in a Gas Stream, ASME Performance Test Code No. 27, New York, N.Y., 1957.

3. Devorkin, Howard, et al., Air Pollution Source Testing Manual, Air Pollution Control District, Los Angeles, Calif., Nov. 1963.

4. Hatch, W. R. and W. L. Ott, "Determination of Sub-Microgram Quantities of Mercury by Atomic Absorption Spectrophotometry," Anal. Chem., 40:2085-87, 1968.

5. Mark, L. S., Mechanical Engineers' Handbook, McGraw-Hill Book Co., Inc., New York, N.Y., 1951.

6. Martin, Robert M., Construction Details of Isokinetic Source Sampling Equipment, Environmental Protection Agency, APTD-0581.

7. Methods for Determination of Velocity, Volume, Dust and Mist Content of Gases, Western Precipitation Division of Joy Mfg. Co., Los Angeles, Calif. Bul. WP-50, 1968.

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10. Shigehara, R. T., W. F. Todd, and W. S. Smith, Significance of Errors in Stack Sampling Measurements, Paper presented at the Annual Meeting of the Air Pollution Control Association, St. Louis, Mo., June 14-19, 1970.

11. Smith, W. S., et al., Stack Gas Sampling Improved and Simplified with New Equipment, APCA paper No. 67-119, 1967.

12. Smith, W. S., R. T. Shigehara, and W. F. Todd, A Method of Interpreting Stack Sampling Data, Paper presented at the 63d Annual Meeting of the Air Pollution Control Association, St. Louis, Mo., June 14-19, 1970.

13. Specifications for Incinerator Testing at Federal Facilities PHS, NCAPC, 1967.

14. Standard Method for Sampling Stacks for Particulate Matter, In: 1971 Book of ASTM Standards, part 23, Philadelphia, 1971, ASTM Designation D-2928-71.

15. Vennard, J. K., Elementary Fluid Mechanics, John Wiley and Sons, Inc., New York, 1947.

METHOD 102. REFERENCE METHOD FOR DETERMINATION OF PARTICULATE AND GASEOUS MERCURY EMISSIONS FROM STATIONARY SOURCES (HYDROGEN STREAMS)

1. *Principle and applicability*—1.1 *Principle*.—Particulate and gaseous mercury emissions are isokinetically sampled from the source and collected in acidic iodine monochloride solution. The mercury collected (in the mercuric form) is reduced to elemental mercury in basic solution by hydroxylamine sulfate. Mercury is aerated from the solution and analyzed using spectrophotometry.

1.2 *Applicability*.—This method is applicable for the determination of particulate and gaseous mercury emissions when the carrier gas stream is principally hydrogen. The method is for use in ducts or stacks at stationary sources. Unless otherwise specified, this method is not intended to apply to gas streams other than those emitted directly to the atmosphere without further processing.

2. *Apparatus*—2.1 *Sampling train*.—A schematic of the sampling train used by EPA is shown in figure 102-1. Commercial models of this train are available, although complete construction details are described in APTD-0581,[1] and operating and maintenance procedures are described in APTD-0576. The components essential to this sampling train are the following:

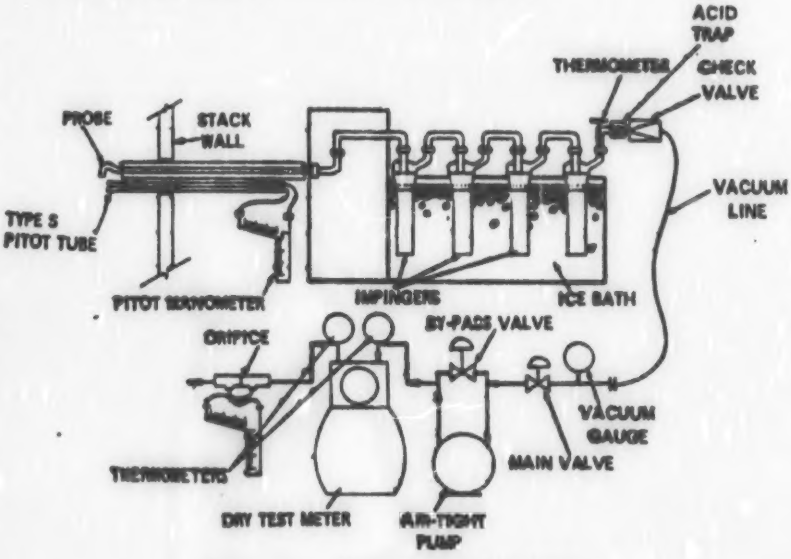

Figure 102-1. Mercury sampling train

2.1.1 *Nozzle*. Stainless steel or glass with sharp, tapered leading edge.

2.1.2 *Probe*. Sheathed Pyrex[2] glass.

2.1.3 *Pitot tube*. Type S (figure 102-2), or equivalent, with a coefficient within 5 percent over the working range, attached to probe to monitor stack gas velocity.

2.1.4 *Impingers*. Four Greenburg-Smith impingers connected in series with glass ball-joint fittings. The first, third, and fourth impingers may be modified by replacing the tip with one-half inch ID glass tube extending to one-half inch from the bottom of the flask.

2.1.5 *Acid trap*. Mine safety appliances air line filter, catalogue No. 81857, with acid absorbing cartridge and suitable connections, or equivalent.

2.1.6 *Metering system*. Vacuum gage, leakless pump, thermometers capable of measuring temperature to within 5°F, dry gas meter with 2 percent accuracy, and related equipment, described in APTD-0581, to maintain an isokinetic sampling rate and to determine sample volume.

2.1.7 *Barometer*. To measure atmospheric pressure to ± 0.1 in hg.

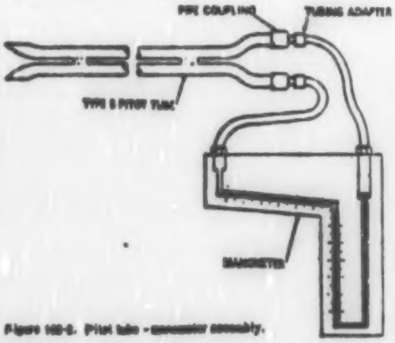

Figure 102-2. Pitot tube - manometer assembly.

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[1] These documents are available for a nominal cost from the National Technical Information Service, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Va. 22151.

[2] Mention of trade names or commercial products does not constitute endorsement by the Environmental Protection Agency.

2.2 *Measurement of stack conditions (stack pressure, temperature, moisture, and velocity)*—2.2.1 *Pitot tube.* Type S, or equivalent, with a coefficient within 5 percent over theworking range.

2.2.2 *Differential pressure gage.* Inclined manometer, or equivalent, to measure velocity head to within 10 percent of the minimum value. Micromanometers should be used if warranted.

2.2.3 *Temperature gage.* Any temperature-measuring device to measure stack temperature to within 1° F.

2.2.4 *Pressure gage.* Pitot tube and inclined manometer, or equivalent, to measure stack pressure to within 0.1 in hg.

2.2.5 *Moisture determination.* Drying tubes, condensers, or equivalent, to determine stack gas moisture content in hydrogen to within 1 percent.

2.3 *Sample recovery*—2.3.1 *Leakless glass sample bottles.* 500 ml and 200 ml with Teflon-lined tops.

2.3.2 *Graduated cylinder.* 250 ml.

2.3.3 *Plastic jar.* Approximately 300 ml.

2.4 *Analysis*—2.4.1 *Spectrophotometer.* To measure absorbance at 253.7 nm. Perkin Elmer model 303, with a cylindrical gas cell (approximately 1.5 in o.d. x 7 in) with quartz glass windows, and hollow cathode source, or equivalent.

2.4.2 *Gas sampling bubbler.* Tudor Scientific Co. Smog Bubbler, catalogue No. TP-1150, or equivalent.

2.4.3 *Recorder.* To match output of spectrophotometer.

3. *Reagents.*—3.1 Stock reagents.—3.1.1 Potassium iodide. Reagent grade.

3.1.2 *Distilled water.*

3.1.3 *Potassium iodide solution, 25 percent.*—Dissolve 250 g of potassium iodide (reagent 3.1.1) in distilled water and dilute to 1 to 1.

3.1.4 *Hydrochloric acid.* Concentrated.

3.1.5 *Potassium iodate.* Reagent grade.

3.1.6 *Iodine monochloride (ICl) 1.0M.* To 800 ml of 25 percent potassium iodide solution (reagent 3.1.3), add 800 ml of concentrated hydrochloric acid. Cool to room temperature. With vigorous stirring, slowly add 135 g of potassium iodate and continue stirring until all free iodine has dissolved to give a clear orange-red solution. Cool to room temperature and dilute to 1,800 ml with distilled water. The solution should be kept in amber bottles to prevent degradation.

3.1.7 *Sodium hydroxide pellets.* Reagent grade.

3.1.8 *Nitric acid.* Concentrated.

3.1.9 *Hydroxylamine sulfate.* Reagent grade.

3.1.10 *Sodium chloride.* Reagent grade.

3.1.11 *Mercuric chloride.* Reagent grade.

3.2 *Sampling.* 3.2.1 *Absorbing solution, 0.1M ICl.* Dilute 100 ml of the 1.0M ICl stock solution (reagent 3.1.6) to 1 l with distilled water. The solution should be kept in glass bottles to prevent degradation. This reagent should be stable for at least 2 months; however, periodic checks should be performed to insure quality.

3.2.2 *Wash acid.* 1:1 V/V nitric acid-water.

3.2.3 *Distilled, deionized water.*

3.2.4 *Silica gel.* Indicating type, 6 to 16 mesh, dried at 350°F for 2 hours.

3.3. *Analysis*—3.3.1 *Sodium hydroxide, 10N.* Dissolve 400 g of sodium hydroxide pellets in distilled water and dilute to 1 l.

3.3.2 *Reducing agent, 12 percent hydroxylamine sulfate, 12 percent sodium chloride.* To 60 ml of distilled water, add 12 g of hydroxylamine sulfate and 12 g of sodium chloride. Dilute to 100 ml. This quantity is sufficient for 20 analyses and must be prepared daily.

3.3.3 *Aeration gas.* Zero grade air.

3.3.4 *Hydrochloric acid, 0.3N.* Dilute 25.5 ml of concentrated hydrochloric acid to 1 l with distilled water.

3.4 *Standard mercury solutions*—3.4.1 *Stock solution.* Add 0.1354 g of mercuric chloride to 80 ml of 0.3N hydrochloric acid. After the mercuric chloride has dissolved, add 0.3N hydrochloric acid and adjust the volume to 100 ml. One ml of this solution is equivalent to 1 mg of free mercury.

3.4.2 *Standard solutions.* Prepare calibration solutions by serially diluting the stock solution (3.4.1) with 0.3N hydrochloric acid. Prepare solutions at concentrations in the linear working range for the instrument to be used. Solutions of 0.2 μg/ml, 0.4 μg/ml and 0.6 μg/ml have been found acceptable for most instruments. Store all solutions in glass-stoppered, glass bottles. These solutions should be stable for at least 2 months; however, periodic checks should be performed to insure quality.

4. *Procedure.* 4.1 Guidelines for source testing are detailed in the following sections. These guidelines are generally applicable; however, most sample sites differ to some degree and temporary alterations such as stack extensions or expansions often are required to insure the best possible sample site. Further, since mercury is hazardous, care should be taken to minimize exposure. Finally, since the total quantity of mercury to be collected generally is small, the test must be carefully conducted to prevent contamination or loss of sample.

4.2 Selection of a sampling site and minimum number of traverse points.

4.2.1 Select a suitable sampling site that is as close as is practicable to the point of atmospheric emission. If possible, stacks smaller than 1 foot in diameter should not be sampled.

4.2.2 The sampling site should be at least eight stack or duct diameters downstream and two diameters upstream from any flow disturbance such as a bend, expansion or contraction. For rectangular cross section, determine an equivalent diameter from the following equation:

$$D_e = \frac{2LW}{L+W} \qquad \text{eq. 102-1}$$

where:

D_e = equivalent diameter.
L = length.
W = width.

4.2.3 When the above sampling site criteria can be met, the minimum number of traverse points is four (4) for stacks 1 foot in diameter or less, eight (8) for stacks larger than 1 foot but 2 feet in diameter or less, and twelve (12) for stacks larger than 2 feet.

4.2.4 Some sampling situations may render the above sampling site criteria impractical. When this is the case, choose a convenient sampling location and use figure 102-3 to determine the minimum number of traverse points. However, use figure 102-3 only for stacks 1 foot in diameter or larger.

4.2.5 To use figure 102-3, first measure the distance from the chosen sampling location to the nearest upstream and downstream disturbances. Divide this distance by the diameter or equivalent diameter to determine the distance in terms of pipe diameters. Determine the corresponding number of traverse points for each distance from figure 102-3. Select the higher of the two numbers of traverse points, or a greater value, such that for circular stacks the number is a multiple of four, and for rectangular stacks the number follows the criteria of section 4.2.2.

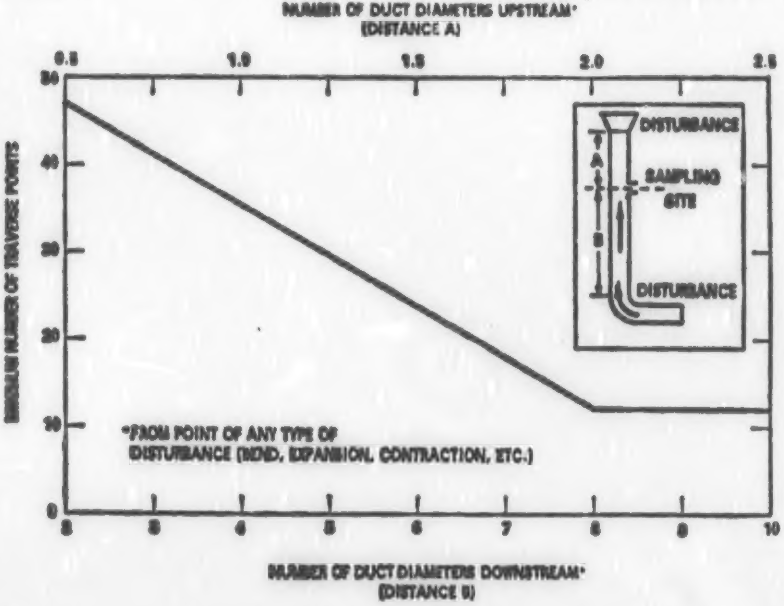

Figure 104-3. Minimum number of traverse points.

4.2.6 If a selected sampling point is closer than 1 inch from stack wall, adjust the location of that point to insure that the sample is taken at least 1 inch away from the wall.

4.3 Cross-sectional layout and location of traverse points.

4.3.1 For circular stacks locate the traverse points on at least two diameters according to figure 102-4 and table 102-1. The traverse axes shall divide the stack-cross section into equal parts.

4.3.2 For rectangular stacks divide the cross-section into as many equal rectangular areas as traverse points, such that the ratio of the length to the width of the elemental areas is between one and two. Locate the traverse points at the centroid of each equal area according to figure 102-5.

4.4 Measurement of stack conditions.

4.4.1 Set up the apparatus as shown in figure 102-2. Make sure all connections are tight and leak free. Measure the velocity head and temperature at the traverse points specified by section 4.2 and 4.3.

4.4.2 Measure the static pressure in the stack.

4.4.3 Determine the stack gas moisture.

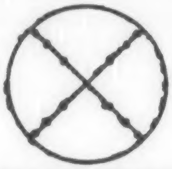

Figure 102-4. Cross section of circular stack showing location of traverse points on perpendicular diameters.

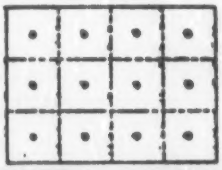

Figure 102-5. Cross section of rectangular stack divided into 12 equal areas, with traverse points at centroid of each area.

Table 102-1. Location of traverse points in circular stacks
(Percent of stack diameter from inside wall to traverse point)

Traverse point number on a diameter	Number of traverse points on a diameter											
	2	4	6	8	10	12	14	16	18	20	22	24
1	14.6	6.7	4.4	3.3	2.5	2.1	1.8	1.6	1.4	1.3	1.1	1.1
2	85.4	25.0	14.7	10.5	8.2	6.7	5.7	4.9	4.4	3.9	3.5	3.2
3		75.0	29.5	19.4	14.6	11.8	9.9	8.5	7.3	6.7	6.0	5.5
4		93.3	70.5	32.3	22.6	17.7	14.6	12.5	10.9	9.7	8.7	7.9
5			85.3	67.7	34.2	25.0	20.1	16.9	14.6	12.9	11.6	10.5
6			95.6	80.6	65.8	35.5	26.9	22.0	18.8	16.5	14.6	13.2
7				89.5	77.4	64.5	36.6	28.3	23.6	20.4	18.0	16.1
8				96.7	85.4	75.0	63.4	37.5	29.6	25.0	21.8	19.4
9					91.8	82.3	73.1	62.5	38.2	30.6	26.1	23.0
10					97.5	88.2	79.9	71.7	61.8	38.8	31.5	27.2
11						93.3	85.4	78.0	70.4	61.2	39.3	32.3
12						97.9	90.1	83.1	76.4	69.4	60.7	39.8
13							94.3	87.5	81.2	75.0	68.5	60.2
14							98.2	91.5	85.4	79.6	73.9	67.7
15								95.1	89.1	83.5	78.2	72.8
16								98.4	92.5	87.1	82.0	77.0
17									95.6	90.3	85.4	80.6
18									98.6	93.3	88.4	83.9
19										96.1	91.3	86.8
20										98.7	94.0	89.5
21											96.5	92.1
22											98.9	94.5
23												96.8
24												98.9

4.4.4 Determine the stack gas molecular weight from the measured moisture content and knowledge of the expected gas stream composition. Sound engineering judgment should be used.

4.5 Preparation of sampling train.

4.5.1 Prior to assembly, clean all glassware (probe, impingers, and connectors) by rinsing with wash acid, tap water, 0.1M ICl, tap water, and finally distilled water. Place 100 ml of 0.1M ICl in each of the first three impingers, and place approximately 200 g. of preweighed silica gel in the fourth impinger. Save 80 ml of the 0.1M ICl as a blank in the sample analysis. Set up the train and the probe as in Figure 102-1.

4.5.2 Leak check the sampling train at the sampling site. The leakage rate should not be in excess of 1 percent of the desired sampling rate. Place crushed ice around the impingers. Add more ice during the run to keep the temperature of the gases leaving the last impinger at 70° F or less.

4.6 Mercury train operation.

4.6.1 Safety procedures. It is imperative that the sampler conduct the source test under conditions of utmost safety, since hydrogen and air mixtures are explosive. The sample train essentially is leakless, so that attention to safe operation can be concentrated at the inlet and outlet. The following specific items are recommended:

4.6.1.1 Operate only the vacuum pump during the test. The other electrical equipment, e.g. heaters, fans and timers, normally are not essential to the success of a hydrogen stream test.

4.6.1.2 Seal the sample port to minimize leakage of hydrogen from the stack.

4.6.1.3 Vent sampled hydrogen at least 10 feet away from the train. This can be accomplished easily by attaching a ¼-in i.d. Tygon tube to the exhaust from the orifice meter.

4.6.2 For each run, record the data required on the sample sheet shown in figure 102-6. Take readings at each sampling point at least every 5 minutes and when significant changes in stack conditions necessitate additional adjustments in flow rate.

4.6.3 Sample at a rate of 0.5 to 1.0 cfm. Samples shall be taken over such a period or periods as are necessary to accurately determine the maximum emissions which would occur in a 24-hour period. In the case of cyclic operations, sufficient tests shall be made so as to allow accurate determination or calculation of the emissions which will occur over the duration of the cycle. A minimum sample time of 2 hours is recommended. In some instances, high mercury concentrations can prevent sampling in one run for the desired minimum time. This is indicated by reddening in the first impinger as free iodine is liberated. In this case, a run may be divided into two or more subruns to insure that the absorbing solutions are not depleted.

PLANT__________
LOCATION__________
OPERATOR__________
DATE__________
RUN NO.__________
SAMPLE BOX NO.__________
METER BOX NO.__________
METER $\Delta H_@$__________
C FACTOR__________

SCHEMATIC OF STACK CROSS SECTION

AMBIENT TEMPERATURE__________
BAROMETRIC PRESSURE__________
ASSUMED MOISTURE, %__________

PROBE LENGTH, m.__________
NOZZLE DIAMETER, in.__________

TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	STATIC PRESSURE (P_s), in. Hg	STACK TEMPERATURE (T_s), °F	VELOCITY HEAD (ΔP_s)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH), in. H_2O	GAS SAMPLE VOLUME (V_m), ft³	GAS SAMPLE TEMPERATURE AT DRY GAS METER		SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
							INLET ($T_{m_{in}}$), °F	OUTLET ($T_{m_{out}}$), °F		
TOTAL							Avg.	Avg.		
AVERAGE							Avg.			

Figure 102-6. Field data

4.6.4 To begin sampling, position the nozzle at the first traverse point with the tip pointing directly into the gas stream. Immediately start the pump and adjust the flow to isokinetic conditions. Sample for at least 5 minutes at each traverse point; sampling time must be the same for each point. Maintain isokinetic sampling throughout the sampling period, using the following procedures.

4.6.4.1 Nomographs which aid in the rapid adjustment of the sampling rate without other computations are in APTD-0576 and are available from commercial suppliers. The available nomographs, however, are set up for use in air streams, and minor changes are required to provide applicability to hydrogen.

4.6.4.2 Calibrate the meter box orifice. Use the techniques as described in APTD-0576.

4.6.4.3 The correction factor nomograph discussed in APTD-0576 and shown on the reverse side of commercial nomographs will not be used. In its place, the correction factor will be calculated using equation 102-2.

$$C=0.01\frac{(C_pM_d)^2}{\Delta H_@}\frac{P_s}{P_m}\frac{T_m}{M_s}$$

eq. 102-2

where:

C = Correction factor.
C_p = Pitot tube coefficient.
M_d = Mole fraction dry gas.
P_s = Stack pressure, inHg.
P_m = Meter pressure, inHg.
T_m = Meter temperature, °R.
M_s = Molecular weight of stack gas (from 4.4.4), lb/lb mole.
$\Delta H_@$ = Meter box calibration factor, obtained in step 4.6.4.2.

4.6.4.4 Set the calculated correction factor on the front of the operating nomograph. Select the proper nozzle and set the K-factor on the nomograph as detailed in APTD-0576.

4.6.4.5 Read the velocity head in the stack at each sample point from the manometer in the meter box. Convert the hydrogen ΔP to an equivalent value for air by multiplying by a ratio of the molecular weight of air to hydrogen at the stack moisture content. Insert this value of ΔP onto the nomograph and read off ΔH. Again, convert the ΔH, which is an air equivalent value, to the ΔH for hydrogen by dividing by 13. This factor includes the ratio of the dry molecular weights and a correction for the different orifice calibration factors for hydrogen and air. This procedure is diagrammed below:

Observe ΔP→Multiply by $\left(\frac{MW\ air}{MWH_2}\right)$→Set this on nomograph.

Read off ΔH→Divide by 13 = WH to be used on meter box.

4.6.4.6 Operate the sample train at the calculated ΔH at each sample point.

4.6.5 Turn off the pump at the conclusion of each run and record the final readings. Immediately remove the probe and nozzle from the stack and handle in accordance with the sample recovery process described in section 4.7.

4.7 Sample recovery.

4.7.1 (All glass storage bottles and the graduated cylinder must be precleaned as in section 4.5.1). This operation should be performed in an area free of possible mercury contamination. Industrial laboratories and ambient air around mercury-using facilities are not normally free of mercury contamination. When the sampling train is moved, care must be exercised to prevent breakage and contamination.

4.7.2 Disconnect the probe from the impinger train. Place the contents (measured to ±1 ml) of the first three impingers into a 500 ml sample bottle. Rinse the probe and all glassware between it and the back half of the third impinger with two 50 ml portions of 0.1M ICl solution. Add these rinses to the first bottle. For a blank, place 50 ml of the 0.1M ICl in a 100 ml sample bottle. Place the silica gel in the plastic jar. Seal and secure all containers for shipment. If an additional test is desired, the glassware can be carefully double rinsed with distilled water and reassembled. However, if the glassware is to be out of use more than 2 days, the initial acid wash procedure must be followed.

4.8 *Analysis*—4.8.1 *Apparatus preparation*.—Clean all glassware according to the procedure of section 4.5.1. Adjust the instrument settings according to the instrument manual, using an absorption wavelength of 253.7 nm.

4.8.2 *Analysis preparation*.—Adjust the air delivery pressure and the needle valve to obtain a constant air flow of about 1.5 l/min. The analysis tube should be bypassed except during aeration. Purge the equipment for 2 minutes. Prepare a sample of mercury standard solution (3.4.2) according to section 4.8.3. Place the analysis tube in the line, and aerate until a maximum peak height is reached on the recorder. Remove the analysis tube, flush the lines, and rinse the analysis tube with distilled water. Repeat with another sample of the same standard solution. This purge and analysis cycle is to be repeated until peak heights are reproducible.

4.8.3 *Sample preparation*.—Just prior to analysis, transfer a sample aliquot of up to 50 ml to the cleaned 100 ml analysis tube. Adjust the volume to 50 ml with 0.1M ICl if required. Add 5 ml of 10 N sodium hydroxide, cap tube with a clean glass stopper and shake vigorously. Prolonged, vigorous shaking at this point is necessary to obtain an accurate analysis. Add 5 ml of the reducing agent (reagent 3.3.2), cap tube with a clean glass stopper and shake vigorously and immediately place in sample line.

4.8.4 *Mercury determination*.—After the system has been stabilized, prepare samples from the sample bottle according to section 4.8.3. Aerate the sample until a maximum peak height is reached on the recorder. The mercury content is determined by comparing the peak heights of the samples to the peak heights of the calibration solutions. If collected samples are out of the linear range, the samples should be diluted. Prepare a blank from the 100 ml bottle according to section 4.8.3 and analyze to determine the reagent blank mercury level.

5. *Calibration*.—5.1 *Sampling Train*. 5.1.1 Use standard methods and equipment as detailed in APTD-0576 to calibrate the rate meter, pitot tube and dry gas meter. Recalibrate prior to each test series.

5.2 *Analysis*.—5.2.1 Prepare a calibration curve for the spectrophotometer using the standard mercury solutions. Plot the peak heights read on the recorder versus the concentration of mercury in the standard solutions. Standards should be interspersed with the samples since the calibration can change slightly with time. A new calibration curve should be prepared for each new set of samples run.

6. *Calculations*—6.1 *Average dry gas meter temperature, stack temperature, stack pressure and average orifice pressure drop*.—See data sheet (fig. 102-6).

6.2 *Dry gas volume*.—Correct the sample volume measured by the dry gas meter to stack conditions by using equation 102-3.

$$V_{m_s}=V_m\frac{T_s}{T_m}\frac{\left(P_{bar}+\frac{\Delta H}{13.6}\right)}{P_s}$$

eq. 102 3

where:

V_{m_s} = Volume of gas sample through the dry gas meter (stack conditions), ft.³
V_m = Volume of gas sample through the dry gas meter (meter conditions), ft³.
T_s = Average temperature of stack gas, °R.
T_m = Average dry gas meter temperature, °R.
P_{bar} = Barometric pressure at the orifice meter, inHg.
ΔH = Average pressure drop across the orifice meter, inH_2O.
13.6 = Specific gravity of mercury.
P_s = Stack pressure, P_{bar} ± static pressure, inHg.

6.3 *Volume of water vapor.*

$$V_{w_s} = K_w V_{l_c} \frac{T_s}{P_s} \qquad \text{eq. 102-4}$$

where:

V_{w_s} = Volume of water vapor in the gas sample (stack conditions), ft³.

$K_w = 0.00267 \frac{\text{in. Hg} - \text{ft}^3}{\text{ml.} - {}^\circ\text{R}}$, when these units are used.

V_{l_c} Total volume of liquid collected in impingers and silica gel (see figure 102-7), ml.

T_s Average stack gas temperature, °R.

P_s Stack pressure, P_{bar} ± static pressure, in. Hg.

6.4 *Total gas volume.*

$$V_{total} = V_{m_s} + V_{w_s} \qquad \text{eq. 102-5}$$

where:

V_{total} = total volume of gas sample (stack conditions), ft³.

V_{m_s} = Volume of gas through dry gas meter (stack conditions), ft³.

V_{w_s} = Volume of water vapor in gas sample (stack conditions), ft³.

	VOLUME OF LIQUID WATER COLLECTED	
	IMPINGER VOLUME, ml	SILICA GEL WEIGHT, g
FINAL		
INITIAL		
LIQUID COLLECTED		
TOTAL VOLUME COLLECTED		g* ml

CONVERT WEIGHT OF WATER TO VOLUME BY dividing total weight INCREASE BY DENSITY OF WATER. (1 g/ml)

$$\frac{\text{INCREASE, g}}{(1\ \text{g/ml})} = \text{VOLUME WATER, ml}$$

Figure 102-7. Analytical data.

6.5 *Stack gas velocity*—Use equation 102-6 to calculate the stack gas velocity.

$$(v_s)_{avg.} = K_p C_p (\sqrt{\Delta P})_{avg.} \sqrt{\frac{(T_s)_{avg.}}{P_s M_s}} \qquad \text{eq 102-6}$$

where:

$(v_s)_{avg.}$ = Average stack gas velocity, feet per second.

$K_p = 85.48 \frac{\text{ft}}{\text{sec}} \left(\frac{\text{lb-inHg}}{\text{lb mole-}{}^\circ\text{R-inH}_2\text{O}} \right)^{1/2}$, when these units are used.

C_p = Pitot tube coefficient, dimensionless.

$(T_s)_{avg.}$ = Average stack gas temperature, °R.

$(\sqrt{\Delta P})_{avg.}$ = Average square root of the velocity head of stack gas $(\text{inH}_2\text{O})^{1/2}$ (see figure 102-8).

P_s = Stack pressure, P_{bar} ± static pressure, in Hg.

M_s = Molecular weight of stack gas (wet basis), the summation of the products of the molecular weight of each component multiplied by its volumetric proportion in the mixture, lb/lb-mole.

Figure 102-8 shows a sample recording sheet for velocity traverse data. Use the averages in the last two columns of figure 102-8 to determine the average stack gas velocity from equation 102-6.

6.6 Mercury collected. Calculate the total weight of mercury collected by using eq. 102-7.

PLANT______________________________

DATE______________________________

RUN NO.______________________________

STACK DIAMETER, In.____________________

BAROMETRIC PRESSURE, In. Hg.______________

STATIC PRESSURE IN STACK (P_g), In. Hg.________

OPERATORS______________________________

SCHEMATIC OF STACK CROSS SECTION

Traverse point number	Velocity head, in. H_2O	$\sqrt{\Delta_p}$	Stack Temperature (T_s), °F
	AVERAGE:		

Figure 102-8. Velocity traverse data.

$$W_t = V_tC_t - V_bC_b \text{ ...... eq. 102-7}$$

where:

W_t = Total weight of mercury collected, μg.
V_t = Total volume of condensed moisture and ICl in sample bottle, ml.
C_t = Concentration of mercury measured in sample bottle, μg/ml.
V_b = Total volume of ICl used in sampling (impinger contents and all wash amounts), ml.
C_b = Blank concentration of mercury in ICl solution, μg/ml.

6.7 *Total mercury emission.*—Calculate the total amount of mercury emitted from each stack per day by equation 102-8. This equation is applicable for continuous operations. For cyclic operations, use only the time per day each stack is in operation. The total mercury emissions from a source will be the summation of results from all stacks.

$$R = \frac{W_t (v_s)_{avg} A_s}{V_{total}} \times \frac{86{,}400 \text{ seconds/day}}{10^6\ \mu g/g} \qquad \text{eq. 102-8}$$

where:

R = Rate of emission, g/day.
W_t = Total weight of mercury collected, μg.
V_{total} = Total volume of gas sample (stack conditions), ft³.
$(v_s)_{avg}$ = Average stack gas velocity, feet per second.
A_s = Stack area, ft².

6.8 *Isokinetic variation (comparison of velocity of gas in probe tip to stack velocity).*

$$I = \frac{100 V_{total}}{A_n \Theta (v_s)_{avg}} \qquad \text{eq. 102-9}$$

where:

I = Percent of isokinetic sampling.
V_{total} = Total volume of gas sample (stack conditions), ft³.
A_n = Probe tip area, ft².
Θ = Sampling time, sec.
$(v_s)_{avg}$ = Average stack gas velocity, feet per second.

7. *Evaluation of results.*—7.1 Determination of compliance.—7.1.1 Each performance test shall consist of three repititions of the applicable test method. For the purpose of determining compliance with an applicable national emission standard, the average of results of all repetitions shall apply.

7.2 *Acceptable isokinetic results.*—7.2.1 The following range sets the limit on acceptable isokinetic sampling results: If $90\% \leq I \leq 110\%$, the results are acceptable; otherwise, reject the test and repeat.

8. *References.*—1. Addendum to Specifications for Incinerator Testing at Federal Facilities, PHS, NCAPC, Dec. 6, 1967.

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13. Specifications for Incinerator Testing at Federal Facilities PHS, NCAPC, 1967.

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METHOD 103. BERYLLIUM SCREENING METHOD

1. *Principle and applicability.*—1.1 *Principle.*—Beryllium emissions are isokinetically sampled from three points in a duct or stack. The collected sample is analyzed for beryllium using an appropriate technique.

1.2 *Applicability.*—This procedure details guidelines and requirements for methods acceptable for use in determining beryllium emissions in ducts or stacks at stationary sources, as specified under the provisions of § 61.14 of the regulations.

2. *Apparatus.*—2.1 *Sampling train.*—A schematic of the required sampling train configuration is shown in figure 103-1. The essential components of the train are the following:

2.1.1 *Nozzle.*—Stainless steel, or equivalent, with sharp, tapered leading edge.

2.1.2 *Probe.*—Sheathed Pyrex[1] glass.

2.1.3 *Filter.*—Millipore AA, or equivalent, with appropriate filter holder that provides a positive seal against leakage from outside or around the filter. It is suggested that a Whatman 41, or equivalent, be placed immediately against the back side of the Millipore filter as a guard against breakage of the Millipore. Include the Whatman 41 in the analysis. Equivalent filters must be at least 99.95 percent efficient (DOP Test) and amenable to the analytical procedure.

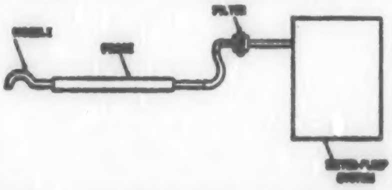

Figure 103-1. Beryllium screening method: sample train schematic.

2.1.4 *Meter-pump system.*—Any system that will maintain isokinetic sampling rate, determine sample volume, and is capable of a sampling rate of greater than 0.5 cfm.

2.2 *Measurement of stack conditions (stack pressure, temperature, moisture and velocity).*—The following equipment shall be used in the manner specified in section 4.3.1.

2.2.1 *Pitot tube.*—Type S, or equivalent, with a coefficient within 5 percent over the working range.

2.2.2 *Differential pressure gauge.*—Inclined manometer, or equivalent, to measure velocity head to within 10 percent of the minimum value.

2.2.3. *Temperature gauge.*—Any temperature measuring device to measure stack temperature to within 5° F.

2.2.4 *Pressure gauge.*—Any device to measure stack pressure to within 0.1 in. Hg.

2.2.5 *Barometer.*—To measure atmospheric pressure to within 0.1 in. Hg.

2.2.6 *Moisture determination.*—Wet and dry bulb thermometers, drying tubes, condensers, or equivalent, to determine stack gas moisture content to within 1 percent.

2.3 *Sample recovery.*—2.3.1 *Probe cleaning equipment.*—Probe brush or cleaning rod at least as long as probe, or equivalent. Clean cotton balls, or equivalent, should be used with the rod.

2.3.2 *Leakless glass sample bottles.*

2.4 *Analysis.*—2.4.1 Equipment necessary to perform an atomic absorption, spectrographic, fluorometric, chromatographic, or equivalent analysis.

3. *Reagents.*—3.1 *Sample recovery.*—3.1.1 *Acetone.*—Reagent grade.

3.1.2 *Wash acid.*—1:1 V/V hydrochloric acid-water.

3.2 *Analysis.*—3.2.1 Reagents as necessary for the selected analytical procedure.

4. *Procedure.*—4.1 Guidelines for source testing are detailed in the following sections. These guidelines are generally applicable; however, most sample sites differ to some degree and temporary alterations such as stack extensions or expansions often are required to insure the best possible sample site. Further, since beryllium is hazardous, care should be taken to minimize exposure. Finally, since the total quantity of beryllium to be collected is quite small, the test must be carefully conducted to prevent contamination or loss of sample.

4.2 *Selection of a sampling site and number of runs.*—4.2.1 Select a suitable sampling site that is as close as practicable to the point of atmospheric emission. If possible, stacks smaller than 1 foot in diameter should not be sampled.

4.2.2 The sampling site should be at least eight stack or duct diameters downstream and two diameters upstream from any flow disturbance such as a bend, expansion or contraction. For rectangular cross-section, determine an equivalent diameter using the following equation:

$$D_e = \frac{2LW}{L+W} \text{ ---------------------- eq. 103-1}$$

where:

D_e = equivalent diameter
L = length
W = width

4.2.3 Some sampling situations may render the above sampling site criteria impractical. When this is the case, an alternate site may be selected but must be no less than two diameters downstream and one-half diameter upstream from any point of disturbance. Additional sample runs are recommended at any sample site not meeting the criteria of section 4.2.2.

4.2.4 Three runs shall constitute a test. The runs shall be conducted at three different points. The three points shall proportionately divide the diameter, i.e. be located at 25, 50 and 75 percent of the diameter from the inside wall. For horizontal ducts, the diameter shall be in the vertical direction. For rectangular ducts, sample on a line through the centroid and parallel to a side. If additional runs are required per section 4.2.3, proportionately divide the duct to accommodate the total number of runs.

4.3 *Measurement of stack conditions.* 4.3.1 Measure the stack gas pressure, moisture, and temperature, using the equipment described in § 2.2. Determine the molecular weight of the stack gas. Sound engineering estimates may be made in lieu of direct measurements. The basis for such estimates shall be given in the test report.

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[1] Mention of trade names or specific products does not constitute endorsement by the Environmental Protection Agency.

4.4 *Preparation of sampling train.*—4.4.1 Assemble the sampling train as shown in figure 103-1. It is recommended that all glassware be precleaned by soaking in wash acid for 2 hours.

4.4.2 Leak check the sampling train at the sampling site. The leakage rate should not be in excess of 1 percent of the desired sample rate.

4.5 *Beryllium train operation.*—4.5.1 For each run, measure the velocity at the selected sampling point. Determine the isokinetic sampling rate. Record the velocity head and the required sampling rate.

4.5.2 Place the nozzle at the sampling point with the tip pointing directly into the gas stream. Immediately start the pump and adjust the flow to isokinetic conditions. At the conclusion of the test, record the sampling rate. Again measure the velocity head at the sampling point. The required isokinetic rate at the end of the period should not have deviated more than 20 percent from that originally calculated.

4.5.3 Sample at a minimum rate of 0.5 ft^3/min. Samples shall be taken over such a period or periods as are necessary to determine the maximum emissions which would occur in a 24-hour period. In the case of cyclic operations, sufficient tests shall be made so as to allow determination or calculation of the emissions which would occur over the duration of the cycle. A minimum sampling time of 2 hours is recommended.

4.5.4 All pertinent data should be included in the test report.

4.6 *Sample recovery.*—4.6.1 It is recommended that all glassware be precleaned as in § 4.4.1. Sample recovery should also be performed in an area free of possible beryllium contamination. When the sampling train is moved, exercise care to prevent breakage and contamination. Set aside a portion of the acetone used in the sample recovery as a blank for analysis. The total amount of acetone used should be measured for accurate blank correction. Blanks can be eliminated if prior analysis shows negligible amounts.

4.6.2 Remove the filter and any loose particulate matter from filter holder and place in a container.

4.6.3 Clean the probe with acetone and a brush or long rod and cotton balls. Wash into the container. Wash out the filter holder with acetone and add to the same container.

4.7 *Analysis.*—4.7.1 Make the necessary preparation of samples and analyze for beryllium. Any currently acceptable method such as atomic absorption, spectrographic, fluorometric, chromatographic, or equivalent may be used.

5. *Calibration and standards*—5.1 *Sampling train.*—5.1.1 As a procedural check, sampling rate regulation should be compared with a dry gas meter, spirometer, rotameter (calibrated for prevailing atmospheric conditions), or equivalent, attached to nozzle inlet of the complete sampling train.

5.1.2 Data from this test and calculations should be shown in test report.

5.2 *Analysis.*—5.2.1 Standardization is made as suggested by the manufacturer of the instrument or the procedures for the analytical method.

6. *Calculations*—6.1 *Total beryllium emission.* Calculate the total amount of beryllium emitted from each stack per day by equation 103-2. This equation is applicable for continuous operations. For cyclic operations, use only the time per day each stack is in operation. The total beryllium emissions from a source will be the summation of results from all stacks.

$$R=\frac{W_t(v_s)_{avg}A_s}{V_{total}}\times\frac{86{,}400\text{ seconds/day}}{10^6\ \mu g/g}$$

where:

R = Rate of emission, g/day.
W_t = Total weight of beryllium collected, μg.
V_{total} = Total volume of gas sampled, ft^3.
$(v_s)_{avg}$ = Average stack gas velocity, feet per second.
A_s = Stack area, ft^2.

7. *Test report.* 7.1 A test report shall be prepared which shall include as a minimum:

7.1.1 A detailed description of the sampling train used and results of the procedural check with all data and calculations made.

7.1.2 All pertinent data taken during test, the basis for any estimates made, calculations, and results.

7.1.3 A description of the test site, including a block diagram with a brief description of the process, location of the sample points in the cross section, dimensions and distances from any point of disturbance.

METHOD 104. REFERENCE METHOD FOR DETERMINATION OF BERYLLIUM EMISSIONS FROM STATIONARY SOURCES

1. *Principle and applicability*—1.1 *Principle.*—Beryllium emissions are isokinetically sampled from the source, and the collected sample is digested in an acid solution and analyzed by atomic absorption spectrophotometry.

1.2 *Applicability.*—This method is applicable for the determination of beryllium emissions in ducts or stacks at stationary sources. Unless otherwise specified, this method is not intended to apply to gas streams other than those emitted directly to the atmosphere without further processing.

2. *Apparatus*—2.1 *Sampling train.*—A schematic of the sampling train used by EPA is shown in figure 104-1. Commercial models of this train are available, although construction details are described in APTD-0581,[1] and operating and maintenance procedures are described in APTD-0576. The components essential to this sampling train are the following:

2.1.1 *Nozzle.*—Stainless steel or glass with sharp, tapered leading edge.

2.1.2 *Probe.*—Sheathed Pyrex[2] glass. A heating system capable of maintaining a minimum gas temperature in the range of the stack temperature at the probe outlet during sampling may be used to prevent condensation from occurring.

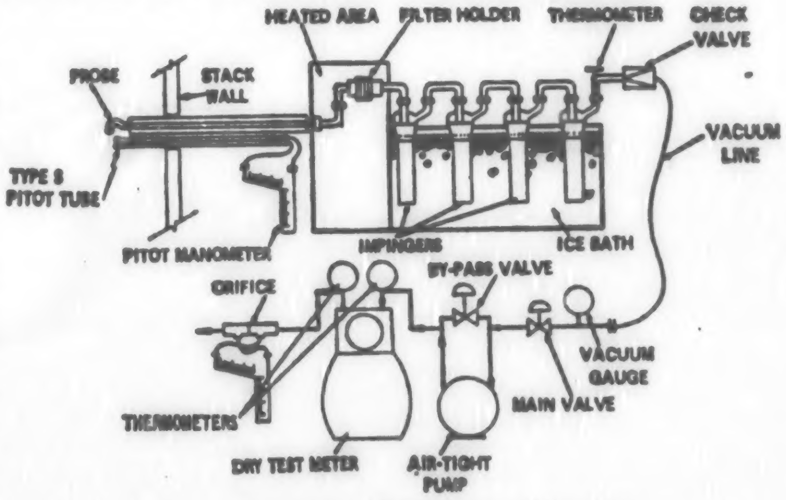

Figure 104-1. Beryllium sampling train

2.1.3 *Pitot tube.*—Type S (figure 104-2), or equivalent, with a coefficient within 5 percent over the working range, attached to probe to monitor stack gas velocity.

2.1.4 *Filter holder.*—Pyrex glass. The filter holder must provide a positive seal against leakage from outside or around the filter. A heating system capable of maintaining the filter at a minimum temperature in the range of the stack temperature may be used to prevent condensation from occurring.

2.1.5 *Impingers.*—Four Greenburg-Smith impingers connected in series with glass ball joint fittings. The first, third, and fourth impingers may be modified by replacing the tip with a ½-inch i.d. glass tube extending to one-half inch from the bottom of the flask.

2.1.6 *Metering system.*—Vacuum gauge, leakless pump, thermometers capable of measuring temperature to within 5° F, dry gas meter with 2 percent accuracy, and related equipment, described in APTD-0581, to maintain an isokinetic sampling rate and to determine sample volume.

2.1.7 *Barometer.*—To measure atmospheric pressure to ± 0.1 in Hg.

2.2 *Measurement of stack conditions (stack pressure, temperature, moisture and velocity)*—2.2.1 *Pitot tube.*—Type S, or equivalent, with a coefficient within 5 percent over the working range.

2.2.2 *Differential pressure gauge.*—Inclined manometer, or equivalent, to measure velocity head to within 10 percent of the minimum value.

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[1] These documents are available for a nominal cost from the National Technical Information Service, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Va. 22151.

[2] Mention of trade names on specific products does not constitute endorsement by the Environmental Protection Agency.

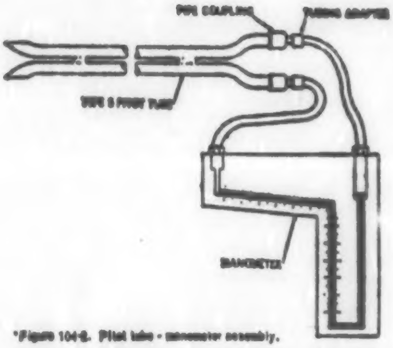

*Figure 104-2. Pitot tube - manometer assembly.

2.2.3 *Temperature gage.*—Any temperature measuring device to measure stack temperature to within 5° F.

2.2.4 *Pressure gage.*—Pitot tube and inclined manometer, or equivalent, to measure stack pressure to within 0.1 in Hg.

2.2.5 *Moisture determination.*—Wet and dry bulb thermometers, drying tubes, condensers, or equivalent, to determine stack gas moisture content to within 1 percent.

2.3 *Sample recovery*—2.3.1 *Probe cleaning rod.*—At least as long as probe.

2.3.2 *Leakless glass sample bottles.*—500 ml.

2.3.3 *Graduated cylinder.*—250 ml.

2.3.4 *Plastic jar.*—Approximately 300 ml.

2.4 *Analysis*—2.4.1 *Atomic absorption spectrophotometer.*—To measure absorbance at 234.8 nm. Perkin Elmer Model 303, or equivalent, with N_2O/acetylene burner.

2.4.2 *Hot plate.*

2.4.3 *Perchloric acid fume hood.*

3. *Reagents*—3.1 *Stock reagents.*—3.1.1 *Hydrochloric acid.*—Concentrated.

3.1.2 *Perchloric acid.*—Concentrated, 70 percent.

3.1.3 *Nitric acid.*—Concentrated.

3.1.4 *Sulfuric acid.*—Concentrated.

3.1.5 *Distilled and deionized water.*

3.1.6 *Beryllium powder.*—98 percent minimum purity.

3.2 *Sampling*—3.2.1 *Filter.* — Millipore AA, or equivalent. It is suggested that a Whatman 41 filter be placed immediately against the back side of the Millipore filter as a guard against breaking the Millipore filter. In the analysis of the filter, the Whatman 41 filter should be included with the Millipore filter.

3.2.2 *Silica gel.*—Indicating type, 6 to 16 mesh, dried at 350° F for 2 hours.

3.2.3 *Distilled and deionized water.*

3.3 *Sample recovery*—3.3.1 *Distilled and deionized water.*

3.3.2 *Acetone.*—Reagent grade.

3.3.3 *Wash acid.*—1:1 V/V hydrochloric acid-water.

3.4 *Analysis.*—3.4.1 *Sulfuric acid solution, 12 N.*—Dilute 333 ml of concentrated sulfuric acid to 1 l with distilled water.

3.4.2 *25 percent V/V hydrochloric acid-water.*

3.5 *Standard beryllium solution*—3.5.1 *Stock solution.*—1 μg/ml beryllium. Dissolve 10 mg of beryllium in 80 ml of 12 N sulfuric acid solution and dilute to a volume of 1000 ml with distilled water. Dilute a 10 ml aliquot to 100 ml with 25 percent V/V hydrochloric acid, giving a concentration of 1 μg/ml. This dilute stock solution should be prepared fresh daily. Equivalent strength (in beryllium) stock solutions may be prepared from beryllium salts as $BeCl_2$ and $Be(NO_3)_2$ (98 percent minimum purity).

4. *Procedure.* 4.1 Guidelines for source testing are detailed in the following sections. These guidelines are generally applicable; however, most sample sites differ to some degree and temporary alterations such as stack extensions or expansions often are required to insure the best possible sample site. Further, since beryllium is hazardous, care should be taken to minimize exposure. Finally, since the total quantity of beryllium to be collected is quite small, the test must be carefully conducted to prevent contamination or loss of sample.

4.2 Selection of a sampling site and minimum number of traverse points.

4.2.1 Select a suitable sampling site that is as close as practicable to the point of atmospheric emission. If possible, stacks smaller than 1 foot in diameter should not be sampled.

4.2.2 The sampling site should be at least 8 stack or duct diameters downstream and 2 diameters upstream from any flow disturbance such as a bend, expansion or contraction. For a rectangular cross-section, determine an equivalent diameter from the following equation:

$$D_e = \frac{2LW}{L+W} \qquad \text{eq. 104-1}$$

where:

D_e = equivalent diameter
L = length
W = width

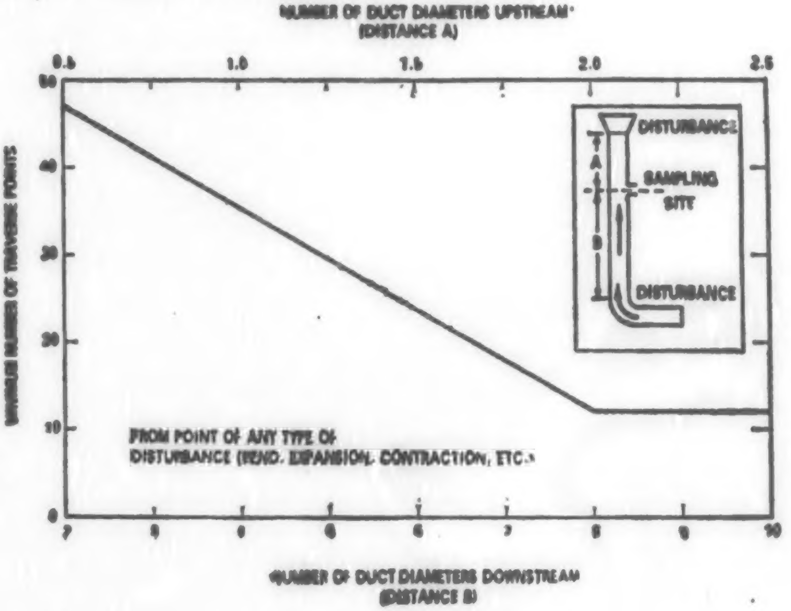

Figure 101-3. Minimum number of traverse points.

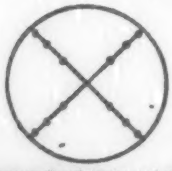

Figure 104-4. Cross section of circular stack showing location of traverse points on perpendicular diameters.

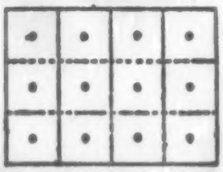

Figure 104-5. Cross section of rectangular stack divided into 12 equal areas, with traverse points at centroid of each area.

4.2.3 When the above sampling site criteria can be met, the minimum number of traverse points is four (4) for stacks 1 foot in diameter or less, eight (8) for stacks larger than 1 foot but 2 feet in diameter or less, and twelve (12) for stacks larger than 2 feet.

4.2.4 Some sampling situations may render the above sampling site criteria impractical. When this is the case, choose a convenient sampling location and use figure 104-3 to determine the minimum number of traverse points. However, use figure 104-3 only for stacks 1 foot in diameter or larger.

4.2.5 To use figure 104-3, first measure the distance from the chosen sampling location to the nearest upstream and downstream disturbances. Divide this distance by the diameter or equivalent diameter to determine the distance in terms of pipe diameters. Determine the corresponding number of traverse points for each distance from figure 104-3. Select the higher of the two numbers of traverse points, or a greater value, such that for circular stacks the number is a multiple of four, and for rectangular stacks the number follows the criteria of section 4.3.2.

4.2.6 If a selected sampling point is closer than 1 inch from the stack wall, adjust the location of that point to ensure that the sample is taken at least 1 inch away from the wall.

4.3 Cross-sectional layout and location of traverse points.

Table 104-1. Location of traverse points in circular stacks
(Percent of stack diameter from inside wall to traverse point)

Traverse point number on a diameter	Number of traverse points on a diameter											
	2	4	6	8	10	12	14	16	18	20	22	24
1	14.6	6.7	4.4	3.3	2.5	2.1	1.8	1.6	1.4	1.3	1.1	1.1
2	85.4	25.0	14.7	10.5	8.2	6.7	5.7	4.9	4.4	3.9	3.5	3.2
3		75.0	29.5	19.4	14.6	11.8	9.9	8.5	7.5	6.7	6.0	5.5
4		93.3	70.5	32.3	22.6	17.7	14.6	12.5	10.9	9.7	8.7	7.9
5			85.3	67.7	34.2	25.0	20.1	16.9	14.6	12.9	11.6	10.5
6			95.6	80.6	65.8	35.5	26.9	22.0	18.8	16.5	14.6	13.2
7				89.5	77.4	64.5	36.6	28.3	23.6	20.4	18.0	16.1
8				96.7	85.4	75.0	63.4	37.5	29.6	25.0	21.8	19.4
9					91.8	82.3	73.1	62.5	38.2	30.6	26.1	23.0
10					97.5	88.2	79.9	71.7	61.8	38.8	31.5	27.2
11						93.3	85.4	78.0	70.4	61.2	39.3	32.3
12						97.9	90.1	83.1	76.4	69.4	60.7	39.8
13							94.3	87.5	81.2	75.0	68.5	60.2
14							98.2	91.5	85.4	79.6	73.9	67.7
15								95.1	89.1	83.5	78.2	72.8
16								98.4	92.5	87.1	82.0	77.0
17									95.6	90.3	85.4	80.6
18									98.6	93.3	88.4	83.9
19										96.1	91.3	86.8
20										98.7	94.0	89.5
21											96.5	92.1
22											98.9	94.5
23												96.8
24												98.9

4.3.1 For circular stacks locate the traverse points on at least two diameters according to figure 104-4 and table 104-1. The traverse axes shall divide the stack cross section into equal parts.

4.3.2 For rectangular stacks divide the cross section into as many equal rectangular areas as traverse points, such that the ratio of the length to the width of the elemental areas is between 1 and 2. Locate the traverse points at the centroid of each equal area according to figure 104-5.

4.4 *Measurement of stack conditions.*—4.4.1 Set up the apparatus as shown in figure 104-2. Make sure all connections are tight and leak free. Measure the velocity head and temperature at the traverse points specified by §§ 4.2 and 4.3.

4.4.2 Measure the static pressure in the stack.

4.4.3 Determine the stack gas moisture.

4.4.4 Determine the stack gas molecular weight from the measured moisture content and knowledge of the expected gas stream composition. A standard Orsat analyzer has been found valuable at combustion sources. In all cases, sound engineering judgment should be used.

4.5 *Preparation of sampling train.*—4.5.1 Prior to assembly, clean all glassware (probe, impingers, and connectors) by soaking in wash acid for 2 hours. Place 100 ml of distilled water in each of the first two impingers, leave the third impinger empty, and place approximately 200 g of preweighted silica gel in the fourth impinger. Save a portion of the distilled water as a blank in the sample analysis. Set up the train and the probe as in figure 104-1.

4.5.2 Leak check the sampling train at the sampling site. The leakage rate should not be in excess of 1 percent of the desired sampling rate. If condensation in the probe or filter is a problem, probe and filter heaters will be required. Adjust the heaters to provide a temperature at or above the stack temperature. However, membrane filters such as the Millipore AA are limited to about 225° F. If the stack gas is in excess of about 200° F., consideration should be given to an alternate procedure such as moving the filter holder downstream of the first impinger to insure that the filter does not exceed its temperature limit. Place crushed ice around the impingers. Add more ice during the test to keep the temperature of the gases leaving the last impinger at 70° F. or less.

4.6 *Beryllium train operation.*—4.6.1 For each run, record the data required on the example sheet shown in figure 104-6. Take readings at each sampling point at least every 5 minutes and when significant changes in stack conditions necessitate additional adjustments in flow rate.

4.6.2 Sample at a rate of 0.5 to 1.0 ft.³/min. Samples shall be taken over such a period or periods as are necessary to accurately determine the maximum emissions which would occur in a 24-hour period. In the case of cyclic operations, sufficient tests shall be made so as to allow accurate determination or calculation of the emissions which will occur over the duration of the cycle. A minimum sample time of 2 hours is recommended.

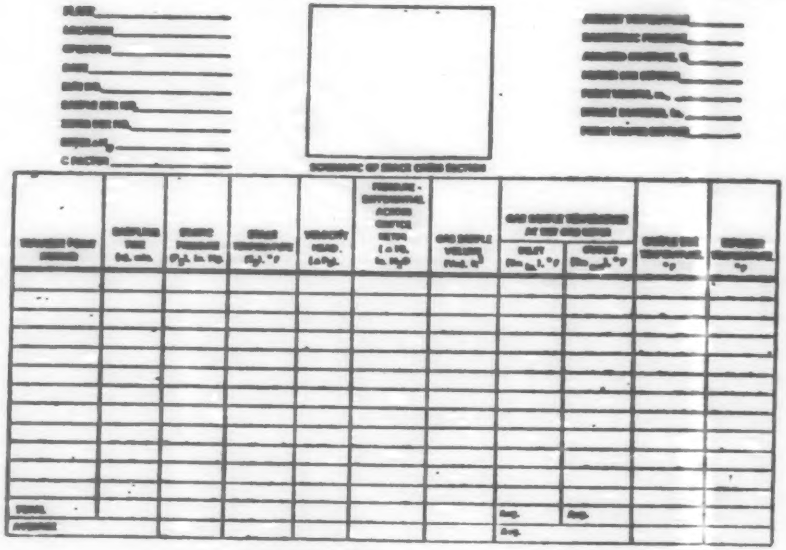

Figure 104-6. Field data

4.6.3 To begin sampling, position the nozzle at the first traverse point with the tip pointing directly into the gas stream. Immediately start the pump and adjust the flow to isokinetic conditions. Sample for at least 5 minutes at each traverse point; sampling time must be the same for each point. Maintain isokinetic sampling throughout the sampling period. Nomographs which aid in the rapid adjustment of the sampling rate without other computations are in APTD-0576 and are available from commercial suppliers. Note that standard nomographs are applicable only for type S pitot tubes and air or a stack gas with an equivalent density. Contact EPA or the sampling train supplier for instructions when the standard nomograph is not applicable.

4.6.4 Turn off the pump at the conclusion of each run and record the final readings. Immediately remove the probe and nozzle from the stack and handle in accordance with the sample recovery process described in § 4.7.

4.7 *Sample recovery.*—4.7.1 (All glass storage bottles and the graduated cylinder must be precleaned as in § 4.5.1.) This operation should be performed in an area free of possible beryllium contamination. When the sampling train is moved, care must be exercised to prevent breakage and contamination.

4.7.2 Disconnect the probe from the impinger train. Remove the filter and any loose particulate matter from the filter holder and place in a sample bottle. Place the contents (measured to ±1 ml) of the first three impingers into another sample bottle. Rinse the probe and all glassware between it and the back half of the third impinger with water and acetone, and add this to the latter sample bottle. Clean the probe with a brush or a long slender rod and cotton balls. Use acetone while cleaning. Add these to the sample bottle. Retain a sample of the water and acetone as a blank. The total amount of wash water and acetone used should be measured for accurate blank correction. Place the silica gel in the plastic jar. Seal and secure all sample containers for shipment. If an additional test is desired, the glassware can be carefully double rinsed with distilled water and reassembled. However, if the glassware is to be out of use more than 2 days, the initial acid wash procedure must be followed.

4.8. Analysis.

4.8.1 *Apparatus preparation.*—Clean all glassware according to the procedure of section 4.5.1. Adjust the instrument settings according to the instrument manual, using an absorption wavelength of 234.8 nm.

4.8.2 *Sample preparation.*—The digestion of beryllium samples is accomplished in part in concentrated perchloric acid. Caution: The analyst must insure that the sample is heated to light brown fumes after the initial nitric acid addition; otherwise, dangerous perchlorates may result from the subsequent perchloric acid digestion. Perchloric acid also should be used only under a perchloric acid hood.

4.8.2.1 Transfer the filter and any loose particulate matter from the sample container to a 150 ml beaker. Add 35 ml concentrated nitric acid. Heat on a hotplate until light brown fumes are evident to destroy all organic matter. Cool to room temperature and add 5 ml concentrated sulfuric acid and 5 ml concentrated perchloric acid. Then proceed with step 4.8.2.4.

4.8.2.2 Place a portion of the water and acetone sample into a 150 ml beaker and put on a hotplate. Add portions of the remainder as evaporation proceeds and evaporate to dryness. Cool the residue and add 35 ml concentrated nitric acid. Heat on a hotplate until light brown fumes are evident to destroy any organic matter. Cool to room temperature and add 5 ml concentrated sulfuric acid, and 5 ml concentrated perchloric acid. Then proceed with step 4.8.2.4.

4.8.2.3 Weigh the spent silica gel and report to the nearest gram.

4.8.2.4 Samples from 4.8.2.1 and 4.8.2.2 may be combined here for ease of analysis. Replace on a hotplate and evaporate to dryness in a perchloric acid hood. Cool and dissolve the residue in 10.0 ml of 25 percent V/V hydrochloric acid. Samples are now ready for the atomic absorption unit. The beryllium concentration of the sample must be within the calibration range of the unit. If necessary, further dilution of sample with 25 percent V/V hydrochloric acid must be performed to bring the sample within the calibration range.

4.8.3 *Beryllium determination.*—Analyze the samples prepared in 4.8.2 at 234.8 nm using a nitrous oxide/acetylene flame. Aluminum, silicon and other elements can interfere with this method if present in large quantities. Standard methods are available, however, to effectively eliminate these interferences (see Reference 5).

5. *Calibration*—5.1 *Sampling train.*—5.1.1 Use standard methods and equipment as detailed in APTD–0576 to calibrate the rate meter, pitot tube, dry gas meter and probe heater (if used). Recalibrate prior to each test series.

5.2 *Analysis.*—5.2.1 Standardization is made with the procedure as suggested by the manufacturer with standard beryllium solution. Standard solutions will be prepared from the stock solution by dilution with 25 percent V/V hydrochloric acid. The linearity of working range should be established with a series of standard solutions. If collected samples are out of the linear range, the samples should be diluted. Standards should be interspersed with the samples since the calibration can change slightly with time.

6. *Calculations*—6.1 *Average dry gas meter temperature, stack temperature, stack pressure and average orifice pressure drop.*—See data sheet (figure 104–6).

6.2 *Dry gas volume.*—Correct the sample volume measured by the dry gas meter to stack conditions by using equation 104–2.

$$V_{m_s} = V_m \frac{T_s}{T_m} \frac{\left(P_{bar} + \frac{\Delta H}{13.6}\right)}{P_s} \qquad \text{eq. 104–2}$$

where:

V_{m_s} = Volume of gas sample through the dry gas meter (stack conditions), ft³.

V_m = Volume of gas sample through the dry gas meter (meter conditions), ft³.

T_s = Average temperature of stack gas, °R.

T_m = Average dry gas meter temperature, °R.

P_{bar} = Barometric pressure at the orifice meter, in Hg.

ΔH = Average pressure drop across the orifice meter, in H₂O.

13.6 = Specific gravity of mercury.

P_s = Stack pressure, P_{bar} ± static pressure, in Hg.

6.3 *Volume of water vapor.*

$$V_{w_s} = K_w V_{l_c} \frac{T_s}{P_s} \qquad \text{eq. 104–3}$$

where:

V_{w_s} = Volume of water vapor in the gas sample (stack conditions), ft³.

$K_w = 0.00267 \frac{\text{inHg-ft}^3}{\text{ml°R}}$, when these units are used.

V_{l_c} = Total volume of liquid collected in impingers and silica gel (see figure 104-7), ml.

T_s = Average stack gas temperature, °R.

P_s = Stack pressure, P_{bar} ± static pressure, in Hg.

6.4 *Total gas volume.*

$$V_{total} = V_{m_s} + V_{w_s} \qquad \text{eq. 104–4}$$

where:

V_{total} = Total volume of gas sample (stack conditions), ft³.

V_{m_s} = Volume of gas through dry gas meter (stack conditions), ft³.

V_{w_s} = Volume of water vapor in gas sample (stack conditions), ft³.

6.5 *Stack gas velocity.*

Use equation 104–5 to calculate the stack gas velocity.

$$(v_s)_{avg.} = K_p C_p (\sqrt{\Delta p})_{avg.} \sqrt{\frac{(T_s)_{avg.}}{P_s M_s}} \qquad \text{eq. 104–5}$$

where:

$(v_s)_{avg.}$ = Average stack gas velocity, feet per second.

$K_p = 85.53 \frac{\text{ft}}{\text{sec}} \left(\frac{\text{lb-inHg}}{\text{lb mole-°R-inH}_2\text{O}}\right)^{1/2}$, when these units are used.

C_p = Pitot tube coefficient, dimensionless.

$(T_s)_{avg.}$ = Average stack gas temperature, °R.

$(\sqrt{\Delta p})_{avg.}$ = Average square root of the velocity head of stack gas $(\text{inH}_2\text{O})^{1/2}$ (see figure 104–6).

P_s = Stack pressure, P_{bar} ± static pressure, in Hg.

M_s = Molecular weight of stack gas (wet basis), the summation of the products of the molecular weight of each component multiplied by its volumetric proportion in the mixture, lb/lb-mole.

	VOLUME OF LIQUID WATER COLLECTED		
	IMPINGER VOLUME, ml	SILICA GEL WEIGHT, g	
FINAL			
INITIAL			
LIQUID COLLECTED			
TOTAL VOLUME COLLECTED		g*	ml

*CONVERT WEIGHT OF WATER TO VOLUME BY dividing total weight INCREASE BY DENSITY OF WATER. (1 g/ml):

$$\frac{\text{INCREASE, g}}{(1\ \text{g/ml})} = \text{VOLUME WATER, ml}$$

Figure 104-7. Analytical data.

PLANT______________________________

DATE______________________________

RUN NO.____________________________

STACK DIAMETER, in.____________________

BAROMETRIC PRESSURE, in. Hg._____________

STATIC PRESSURE IN STACK (P_g), in. Hg.________

OPERATORS__________________________

SCHEMATIC OF STACK CROSS SECTION

Traverse point number	Velocity head, in. H_2O	$\sqrt{\Delta_p}$	Stack Temperature (T_s), °F
	AVERAGE:		

Figure 104-6. Velocity traverse data.

Figure 104-6 shows a sample recording sheet for velocity traverse data. Use the averages in the last two columns of figure 104-6 to determine the average stack gas velocity from equation 104-5.

6.6 *Beryllium collected.*—Calculate the total weight of beryllium collected by using equation 104-6.

$$W_t = V_1C_1 - V_wC_w - V_aC_a \quad \text{eq. 104-6}$$

where:

W_t = Total weight of beryllium collected, μg.

V_1 = Total volume of hydrochloric acid from step 4.8.2.4, ml.

C_1 = Concentration of beryllium found in sample, μg/ml.

V_w = Total volume of water used in sampling (impinger contents plus all wash amounts), ml.

C_w = Blank concentration of beryllium in water, μg/ml.

V_a = Total volume of acetone used in sampling (all wash amounts), ml.

C_a = Blank concentration of beryllium in acetone, μg/ml.

6.7 *Total beryllium emissions.*—Calculate the total amount of beryllium emitted from each stack per day by equation 104-7. This equation is applicable for continuous operations. For cyclic operations, use only the time per day each stack is in operation. The total beryllium emissions from a source will be the summation of results from all stacks.

$$R = \frac{W_t (v_s)_{avg} A_s}{V_{total}} \times \frac{86{,}400 \text{ seconds/day}}{10^6 \ \mu g/g} \quad \text{eq. 104-7}$$

where:

R = Rate of emission, g/day.

W_t = Total weight of beryllium collected, μg.

V_{total} = Total volume of gas sample (stack conditions), ft³.

$(v_s)_{avg}$ = Average stack gas velocity, feet per second.

A_s = Stack area, ft².

6.5 *Isokinetic variation (comparison of velocity of gas in probe tip to stack velocity).*

$$I=\frac{100V_{\text{total}}}{A_n\Theta(v_s)_{\text{avg.}}}$$

eq. 104-8

where:

I = Percent of isokinetic sampling.
V_{total} = Total volume of gas sample (stack conditions), ft³.
A_n = Probe tip area, ft².
Θ = Sampling time, sec.
$(v_s)_{\text{avg.}}$ = Average stack gas velocity, feet per second

7. *Evaluation of results*—7.1 *Determination of compliance.*—7.1.1 Each performance test shall consist of three repetitions of the applicable test method. For the purpose of determining compliance with an applicable national emission standard, the average of results of all repetitions shall apply.

7.2 *Acceptable isokinetic results.*—7.2.1 The following range sets the limit on acceptable isokinetic sampling results:

If 90 percent $\leq I \leq$ 110 percent, the results are acceptable; otherwise, reject the test and repeat.

8. *References*—1. Addendum to Specifications for Incinerator Testing at Federal Facilities, PHS, NCAPC, December 6, 1967.

2. Amos, M. D., and Willis, J. B., "Use of High-Temperature Pre-Mixed Flames in Atomic Absorption Spectroscopy," Spectrochim. Acta, 22: 1325, 1966.

3. Determining Dust Concentration in a Gas Stream, ASME Performance Test Code No. 27, New York, N.Y., 1957.

4. Devorkin, Howard et al., Air Pollution Source Testing Manual, Air Pollution Control District, Los Angeles, Calif. November 1963.

5. Fleet, B., Liberty, K. V., and West, T. S., "A Study of Some Matrix Effects in the Determination of Beryllium by Atomic Absorption Spectroscopy in the Nitrous Oxide-Acetylene Flame," Talanta, 17: 203, 1970.

6. Mark, L. S., Mechanical Engineers' Handbook, McGraw-Hill Book Co., Inc., New York, N.Y., 1951.

7. Martin, Robert M., Construction Details of Isokinetic Source Sampling Equipment, Environmental Protection Agency, APTD-0581.

8. Methods for Determination of Velocity, Volume, Dust and Mist Content of Gases, Western Precipitation Division of Joy Manufacturing Co., Los Angeles, Calif. Bulletin WP-50, 1968.

9. Perkin Elmer Standard Conditions (Rev. March 1971).

10. Perry, J. H., Chemical Engineers' Handbook, McGraw-Hill Book Co., Inc., New York, N.Y., 1960.

11. Rom, Jerome J., Maintenance, Calibration, and Operation of Isokinetic Source Sampling Equipment, Environmental Protection Agency, APTD-0576.

12. Shigehara, R. T., W. F. Todd, and W. S. Smith, Significance of Errors in Stack Sampling Measurements, Paper presented at the annual meeting of the Air Pollution Control Association, St. Louis, Mo., June 14-19, 1970.

13. Smith, W. S. et al., Stack Gas Sampling Improved and Simplified with New Equipment, APCA Paper No. 67-119, 1967.

14. Smith, W. S., R. T. Shigehara, and W. F. Todd, A Method of Interpreting Stack Sampling Data, Paper presented at the 63d annual meeting of the Air Pollution Control Association, St. Louis, Mo., June 14-19, 1970.

15. Specifications for Incinerator Testing at Federal Facilities, PHS, NCAPC, 1967.

16. Standard Method for Sampling Stacks for Particulate Matter, In: 1971 Book of ASTM standards, Part 23, Philadelphia, 1971, ASTM Designation D-2928-71.

17. Vennard, J. K. Elementary Fluid Mechanics. John Wiley and Sons, Inc., New York, 1947.

[FR Doc. 73-6423 Filed 4-5-73;8:45 am]

2

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Asbestos, Beryllium, and Mercury

Pursuant to section 112 of the Clean Air Act, as amended (42 U.S.C. 1857c-7), the Administrator of the Environmental Protection Agency promulgated national emission standards for the hazardous air pollutants asbestos, beryllium, and mercury on April 6, 1973 (38 FR 8820). The subsequent enforcement of these regulations has demonstrated a need for the clarifying revisions which follow. These revisions are necessary to advise the public of how the regulations are being interpreted in Agency enforcement activities. The revisions promulgated herein do not alter the stringency of the regulations.

A change to Subpart A, General Provisions, which applies to all affected sources, is promulgated. The definition of "alternative method" is revised to indicate more clearly that it is not a "reference method" or "equivalent method" and to make the definition consistent with that used in 40 CFR Part 60, Standards of Performance for New Stationary Sources.

The applicability of the asbestos regulation is discussed in the following documents which are available on request from the Emission Standards and Engineering Division, Environmental Protection Agency, Research Triangle Park, North Carolina 27711, Attention: Mr. Don R. Goodwin:

1. Preamble to the proposed regulation (36 FR 23239)
2. Background information document for the proposed regulation (APTD-0753)
3. Preamble to the promulgated regulation (38 FR 8820)
4. Background information document for the promulgated regulation (APTD-1503)

Comments from the owners or operators of affected sources and from Agency regional enforcement personnel have indicated, however, that the intent should be specifically expressed in the text of the regulation. Considering this, the Agency determined that the text of the promulgated regulation should be revised and four definitions are added to clarify the applicability of 40 CFR Part 61, Subpart B, National Emission Standard for Asbestos.

The definition of "commercial asbestos" is added to distinguish between asbestos that is produced as a product and asbestos that occurs as a contaminant ingredient in other materials, and to make it clear that materials that contain asbestos as a contaminant only are not covered. Questions were raised concerning the applicability of the standard to manufacturing operations that use talc and vermiculite. As indicated on page 6 of the background information report for the proposed standards (APTD-0753), talc mines were not covered by the proposed standards; this was also intended to indicate that manufacturing operations that use talc or other materials contaminated with asbestos were not covered by the asbestos standard. In addition, the information available to the Agency at the time of promulgation (April 6, 1973) did not demonstrate that the mining and milling of such materials or manufacturing operations using such materials were major sources of asbestos emissions. The Department of the Interior and the Department of Health, Education and Welfare are studying the health effects of asbestos in talc. The revisions promulgated herein merely clarify the regulations promulgated April 6, 1973, and do not involve prejudgments concerning the outcome of investigations now underway.

Asbestos is also a contaminant in taconite ore. EPA at this time believes that asbestos releases from the milling of such ores should be covered by the hazardous air pollutant regulations and intends in the near future to propose for comment regulations which would accomplish this. Because the revisions here being promulgated are only clarifications of the Agency's intentions at the time the initial hazardous air pollutant regulations for asbestos were published and because they are not being proposed for comment, EPA believes that it is not appropriate to include restrictions on releases of asbestos from taconite milling operations in these revisions.

The regulation promulgated on April 6, 1973, did not include a definition for "asbestos mill" or "manufacturing" operation, and questions arose concerning whether certain operations at these facilities are covered by the regulation, and whether the regulation applies to all milling and manufacturing operations that process ore or materials that contain asbestos. The definition of "asbestos mill" is added to clarify that the regulation covers ore crushing and conveying of asbestos tailings to disposal piles but does not cover open storage areas and asbestos tailings disposal piles. This was explained in the preamble to the promulgated regulations (38 FR 8821) and on pages 30 and 31 of the background information report (APTD-1503). The definition excludes the milling of ores that contain asbestos minerals only as a contaminant as previously discussed under the definition of "commercial asbestos." As noted earlier, the Agency intends to propose regulations covering taconite milling operations.

The definition of "manufacturing" is added to clarify that the regulation applies to only those sources within the specified categories of affected manufacturing facilities that process commercial asbestos into a product. Operations which process (cut, shape, assemble, mix, or otherwise alter) a manufactured product that contains commercial asbestos at a separate location are not intended to be covered by the regulation, and are classified as fabricating rather than manufacturing operations. The information available to EPA prior to promulgation was that new construction sites were the only major sources of asbestos emissions from fabrication operations and that these sources were adequately regulated by Occupational Safety and Health Administration standards. This was explained in the preamble to the promulgated regulation (38 FR 8821) and on page 32 of the background information report (APTD-1503).

Some questions have arisen concerning what operations constitute demolition. The definition of "demolition" is added to clarify that demolition occurs only in situations where load-supporting structural members are wrecked or removed. Accordingly, the standard does not apply to remodeling and renovation operations in which load-supporting structural members are not wrecked.

The time allowed owners or operators to notify the Administrator prior to commencement of a demolition operation is changed from 20 days to 10 days, and the time basis for the notification is clarified to be the postmark date of the notice. Experience has shown that 20 days' notice is not necessary to provide sufficient time for effective enforcement of the regulation, and the shorter time will be more convenient to demolition contractors.

Some questions have arisen concerning whether all of the friable asbestos materials on pipes, boilers, or load-supporting structural members had to be wetted and stripped off prior to demolition. The wording in § 61.22(d)(2)(i) of the promulgated regulation states that the friable asbestos material has to be removed, but does not specify the procedure to be used. A statement is added to clarify that it is not necessary for friable asbestos material to be removed or stripped from boilers, pipes, or load-supporting structural members prior to the removal of these items as units or in sections, provided that the asbestos material exposed during removal is wetted. As required in § 61.22(d)(2)(iii), such units or sections must subsequently be carefully lowered or taken to the ground level.

A paragraph is added to clarify that the regulation is not violated when uncombined water is the sole reason a source fails to meet the no-visible-emissions requirement. This makes the no-visible-emissions regulation consistent with other similar Agency regulations.

The Agency is presently studying the extent of asbestos emission from dumps of asbestos tailings and open storage of asbestos ores, disposal of asbestos waste material, and asbestos fabricating operations. Beryllium and mercury emissions resulting from the incineration of sewage sludge are also being studied. These investigations are nearing completion and the Agency will determine whether it is necessary to regulate these sources of hazardous pollutants to provide an ample margin of safety to protect the public health. The revisions to the regulations promulgated herein merely clarify the regulations promulgated April 6, 1973, and do not preclude subsequent revisions to the regulations as indicated by the studies described above.

The Agency finds that good cause exists for not proposing these revisions and for making them effective upon publication since (1) the revisions make certain clarifications, but do not change the substance of the national emission standards for asbestos, beryllium, and mercury; and (2) there is a pressing need to promulgate these revisions so that the asbestos standard can be uniformly interpreted by industry personnel and enforced by the Agency. Therefore, the Administrator has determined that it is unnecessary to publish a notice of proposed rulemaking or delay the effective date of this amendment and for the reasons cited has not done so.

The amendment of these regulations is promulgated pursuant to section 112 of the Clean Air Act, as amended (42 U.S.C. 1857c-7), and is effective upon promulgation.

Dated: April 29, 1974.

JOHN QUARLES,
Acting Administrator.

Part 61, Chapter I, Title 40, Code of Federal Regulations is amended by revising Subparts A and B as follows:

Subpart A—General Provisions

1. Section 61.02 is amended by revising paragraph (c) to read as follows:

§ 61.02 Definitions.

* * * * *

(c) "Alternative method" means any method of sampling and analyzing for an air pollutant which is not a reference method or an equivalent method but which has been demonstrated to the Administrator's satisfaction to produce, in specific cases, results adequate for his determination of compliance.

* * * * *

Subpart B—National Emission Standard for Asbestos

2. Section 61.21 is amended by adding paragraphs (g), (h), (i), and (j). The added paragraphs read as follows:

§ 61.21 Definitions.

* * * * *

(g) "Asbestos mill" means any facility engaged in the conversion or any intermediate step in the conversion of asbestos ore into commercial asbestos. Outside storage of asbestos materials is not considered a part of such facility.

(h) "Commercial asbestos" means any variety of asbestos which is produced by extracting asbestos from asbestos ore.

(i) "Manufacturing" means the combining of commercial asbestos, or in the case of woven friction products the combining of textiles containing commercial asbestos, with any other material(s), including commercial asbestos, and the processing of this combination into a product as specified in § 61.22(c).

(j) "Demolition" means the wrecking or removal of any load-supporting structural member.

3. Section 61.22 is amended by revising paragraphs (a), (d)(1), (d)(2)(i), and (d)(4), and by adding paragraph (g). The revised and added paragraphs read as follows:

§ 61.22 Emission standard.

(a) Asbestos mills: There shall be no visible emissions to the outside air from any asbestos mill except as provided in paragraph (f) of this section.

* * * * *

(d) * * *

(1) Written notice of intention to demolish shall be provided to the Administrator by the owner or operator of the demolition operation. Such notice shall be postmarked at least 10 days prior to commencement of such demolition, or anytime prior to commencement of demolition subject to paragraph (d)(4) of this section. Such notice shall include the following information:

(i) Name of owner or operator.

(ii) Address of owner or operator.

(iii) Description of the building, structure, facility, or installation to be demolished.

(iv) Address or location of the building, structure, facility or installation.

(v) Scheduled starting and completion dates of demolition.

(vi) Method of demolition to be employed.

(vii) Procedures to be employed to meet the requirements of this paragraph.

(2) * * *

(i) Friable asbestos materials, used to insulate or fireproof any boiler, pipe, or load-supporting structural member, shall be wetted and removed from any building, structure, facility, or installation subject to this paragraph before wrecking of load-supporting structural members is commenced. Boilers, pipe, or load-supporting structural members that are insulated or fireproofed with friable asbestos materials may be removed as units or in sections without stripping or wetting, except that where the boiler, pipe, or load-supporting structural member is cut or disjointed, the exposed friable asbestos materials shall be wetted. Friable asbestos debris shall be wetted adequately to insure that such debris remains wet during all stages of demolition and related handling operations.

* * * * *

(4) Any owner or operator of a demolition operation who intends to demolish a building, structure, facility, or installation to which the provisions of this paragraph would be applicable but which has been declared by proper State or local authority to be structurally unsound and which is in danger of imminent collapse is exempt from the requirements of this paragraph other than the reporting requirements specified by paragraph (d)(1) of this section and the wetting of friable asbestos debris as specified by paragraph (d)(2)(i) of this section.

* * * * *

(g) Where the presence of uncombined water is the sole reason for failure to meet the no-visible-emission requirement of paragraphs (a), (c), or (e) of this section, such failure shall not be a violation of such emission requirements.

[FR Doc.74-10252 Filed 5-2-74;8:45 am]

3

Title 40—Protection of the Environment

[FRL [illegible]]

CHAPTER I—ENVIRONMENTAL PROTECTION AGENCY

SUBCHAPTER C—AIR PROGRAMS

PART 52—APPROVAL AND PROMULGATION OF IMPLEMENTATION PLANS

PART 60—STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Region V Office: New Address

The Region V Office of EPA has been relocated. The new address is: EPA, Region V, Federal Building, 230 South Dearborn, Chicago, Illinois 60604. This change revises Region V's office address appearing in §§ 52.16, 60.4 and 61.04 of Title 40, Code of Federal Regulations.

Dated: October 21, 1974.

ROGER STRELOW,
Assistant Administrator for Air and Waste Management.

Parts 52, 60 and 61, Chapter I, Title 40 of the Code of Federal Regulations are amended as follows:

§§ 52.16, 60.4, 61.04 [Amended]

1. The address of the Region V office is revised to read:

Region V (Illinois, Indiana, Minnesota, Ohio, Wisconsin) Federal Building, 230 South Dearborn, Chicago, Illinois 60606.

[FR Doc.74-24919 Filed 10-24-74;8:45 am]

FEDERAL REGISTER, VOL. 39, NO. 208—FRIDAY, OCTOBER 25, 1974

4

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Delegation of Authority to State of Washington

Pursuant to the delegation of authority for the national emission standards for hazardous air pollutants (NESHAPS) to the State of Washington on February 28, 1975, EPA is today amending 40 CFR 61.04 *Address*. A Notice announcing this delegation was published on April 1, 1975 (40 FR 14632). The amended § 61.04 is set forth below.

The Administrator finds good cause for making this rulemaking effective immediately as the change is an administrative change and not one of substantive content. It imposes no additional substantive burdens on the parties affected.

This rulemaking is effective immediately, and is issued under the authority of section 112 of the Clean Air Act, as amended. 42 U.S.C. 1857c-7.

Dated April 21, 1975.

ROGER STRELOW,
Assistant Administrator for
Air and Waste Management.

Part 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

Subpart A—General Provisions

1. Section 61.04 is revised to read as follows:

§ 61.04 Address.

(a) All requests, reports, applications, submittals, and other communications to the Administrator pursuant to this part shall be submitted in duplicate and addressed to the appropriate Regional Office of the Environmental Protection Agency, to the attention of the Director, Enforcement Division. The regional offices are as follows:

Region I (Connecticut, Maine, New Hampshire, Massachusetts, Rhode Island, Vermont), John F. Kennedy Federal Building, Boston, Massachusetts 02203.

Region II (New York, New Jersey, Puerto Rico, Virgin Islands), Federal Office Building, 26 Federal Plaza (Foley Square), New York, N.Y. 10007.

Region III (Delaware, District of Columbia, Pennsylvania, Maryland, Virginia, West Virginia), Curtis Building, Sixth and Walnut Streets, Philadelphia, Pennsylvania 19106.

Region IV (Alabama, Florida, Georgia, Mississippi, Kentucky, North Carolina, South Carolina, Tennessee), Suite 300, 1421 Peachtree Street, Atlanta, Georgia 30309.

Region V (Illinois, Indiana, Minnesota, Michigan, Ohio, Wisconsin), 1 North Wacker Drive, Chicago, Illinois 60606.

Region VI (Arkansas, Louisiana, New Mexico, Oklahoma, Texas), 1600 Patterson Street, Dallas, Texas 75201.

Region VII (Iowa, Kansas, Missouri, Nebraska), 1735 Baltimore Street, Kansas City, Missouri 64108.

Region VIII (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming), 196 Lincoln Towers, 1860 Lincoln Street, Denver, Colorado 80203.

Region IX (Arizona, California, Hawaii, Nevada, Guam, American Samoa), 100 California Street, San Francisco, California 94111.

Region X (Washington, Oregon, Idaho, Alaska), 1200 Sixth Avenue, Seattle, Washington 98101.

(b) Section 112(d) directs the Administrator to delegate to each State, when appropriate, the authority to implement and enforce the national emission standards for hazardous air pollutants for stationary sources located in such State. All information required to be submitted to EPA under paragraph (a) of this section, must also be submitted to the appropriate State Agency of any State to which this authority has been delegated (provided, that each specific delegation may exempt sources from a certain federal or State reporting requirement). The appropriate mailing address for those States whose delegation request has been approved is as follows:

(A)-(Z) [reserved].
(AA)-(VV) [reserved].
WW-Washington; State of Washington, Department of Ecology, Olympia, Washington 98504.
(XX)-(ZZ) [reserved].
(AAA)-(DDD) [reserved].

[FR Doc.75-10798 Filed 4-24-75;8:45 am]

5

[FRL 439-5]

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Delegation of Authority to State of California on Behalf of Bay Area, Monterey Bay Unified, Humboldt County and Del Norte County Air Pollution Control Districts

Pursuant to the delegations of authority for national emission standards for hazardous air pollutants (NESHAPS) to the State of California on behalf of the Bay Area and Monterey Bay Unified Air Pollution Control Districts (dated May 23, 1975), and on behalf of the Humboldt County and Del Norte County Air Pollution Control Districts (dated July 10, 1975), EPA is today amending 40 CFR 61.04, *Address*, to reflect these delegations. Notices announcing these delegations are published today in the Notices Section of this issue. The amended § 61.04 is set forth below. It adds the addresses of the Bay Area, Monterey Bay Unified, Humboldt County, and Del Norte County Air Pollution Control Districts, to which must be addressed all reports, requests applications, submittals, and communications pursuant to this part by sources subject to the NESHAPS located within these Air Pollution Control Districts.

The Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegations which are reflected by this administrative amendment were effective on May 23, 1975 (Bay Area and Monterey Bay Districts), and on July 10, 1975 (Humboldt County and Del Norte County Districts), and it serves no purpose to delay the technical change of this addition of the Air Pollution District addresses to the Code of Federal Regulations.

This rulemaking is effective immediately, and is issued under the authority of section 112 of the Clean Air Act, as amended. 42 U.S.C. 1857c-7.

Dated: September 6, 1975.

STANLEY W. LEGRO,
Assistant Administrator for
Enforcement.

Part 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

1. In § 61.04 paragraph (b) is amended by revising subparagraph (F), to read as follows:

§ 61.04 Address.

* * * * *

(b) * * *
(A)-(E) * * *
(F) California.

Bay Area Air Pollution Control District, 939 Ellis St., San Francisco, CA 94109.

Del Norte County Air Pollution Control District, Courthouse, Crescent City, CA 95531.

Humboldt County Air Pollution Control District, 5600 S. Broadway, Eureka, CA 95501.

Monterey Bay Unified Air Pollution Control District, 420 Church St. (P.O. Box 487), Salinas, CA 93901.

* * * * *

[FR Doc.75-24202 Filed 9-10-75;8:45 am]

6

[FRL 438-4]

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Delegation of Authority to State of California on Behalf of Kern County and Trinity County Air Pollution Control Districts

Pursuant to the delegation of authority for national emission standards for hazardous air pollutants (NESHAPS) to the State of California on behalf of the Kern County Air Pollution Control District and the Trinity County Air Pollution Control District, dated August 18, 1975, EPA is today amending 40 CFR 61.04, Address, to reflect this delegation. A Notice announcing this delegation is published today at 40 FR 45221. The amended § 61.04 is set forth below. It adds the addresses of the Kern County and Trinity County Air Pollution Control Districts, to which must be addressed all reports, requests, applications, submittals, and communications pursuant to this part by sources subject to the NESHAPS located within these Air Pollution Control Districts.

The Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegation which is reflected by this administrative amendment was effective on August 18, 1975, and it serves no purpose to delay the technical change of this addition of the Air Pollution Control District addresses to the Code of Federal Regulations.

This rulemaking is effective immediately, and is issued under the authority of Section 112 of the Clean Air Act, as amended, 42 U.S.C. 1857c-7.

Dated: September 25, 1975.

STANLEY W. LEGRO,
Assistant Administrator for Enforcement.

Part 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

1. In § 61.04 paragraph (b) is amended by revising subparagraph F, to read as follows:

§ 61.04 Address.

* * * * *

(b) * * *

(A)-(E) * * *

F—California—

Bay Area Air Pollution Control District, 939 Ellis St., San Francisco, CA 94109.

Del Norte County Air Pollution Control District, Courthouse, Crescent City, CA 95531.

Humboldt County Air Pollution Control District, 5600 S. Broadway, Eureka, CA 95501.

Kern County Air Pollution Control District, 1700 Flower St. (P.O. Box 997), Bakersfield, CA 93302.

Monterey Bay Unified Air Pollution Control District, 420 Church St. (P.O. Box 487), Salinas, CA 93901.

Trinity County Air Pollution Control District, Box AJ, Weaverville, CA 96093.

* * * * *

[FR Doc.75-26273 Filed 9-30-75;8:45 am]

7 Title 40—Protection of Environment

CHAPTER I—ENVIRONMENTAL PROTECTION AGENCY

[FRL 431-2]

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Amendments to Standards for Asbestos and Mercury

On October 25, 1974 (39 FR 38064), pursuant to section 112 of the Clean Air Act, as amended, the Administrator proposed amendments to national emission standards for the hazardous air pollutants asbestos and mercury. The Administrator also proposed amendments to Appendix B, Test Methods, of this part.

Interested persons representing industry, trade associations, environmental groups, and Federal, State and local governments participated in the rulemaking by sending comments to the Agency. Commentators submitted 40 letters, many with multiple comments. The comments have been considered, and the proposed amendments have been reevaluated. Each comment, some of which were submitted by more than one party, has been separately addressed in writing by the Agency. The Freedom of Information Center, Room 202 West Tower, 401 M Street, SW, Washington, D.C. has copies of the comment letters received and a summary of the issues and Agency responses available for public inspection. In addition, copies of the issue summary and Agency responses may be obtained upon written request from the EPA Public Information Center (PM-215), 401 M Street, S.W., Washington, D.C. 20460 (specify Public Comment Summary—Proposed Amendments to National Emission Standards for Hazardous Air Pollutants—Asbestos and Mercury). Where determined by the Administrator to be appropriate, changes have been made to the proposed amendments, and the revised version of the amendments to the national emission standards for asbestos and mercury is promulgated herein. The principal changes to the proposed amendments and the Agency's responses to the major comments received are summarized below.

Copies of *Background Information on National Emission Standards for Hazardous Air Pollutants—Proposed Amendments to Standards for Asbestos and Mercury* (EPA-450/2-74-009a) which explains the basis for the proposed amendments are available on request from the Emission Standards and Engineering Division, Research Triangle Park, North Carolina 27711, Attention: Mr. Don R. Goodwin.

ASBESTOS

CHANGES TO PROPOSED AMENDMENTS

Manufacturing. The Agency received numerous comments stating that the proposed amendments should apply only to asphalt concrete manufacturing plants that use asbestos. This was the Agency's intent. Section 61.22(c) has been revised by the addition of the wording, "that use commercial asbestos."

Demolition and Renovation. A comment was received during review of the amendments within the Agency that ducts can be insulated with amounts of friable asbestos material similar to those on boilers, tanks, reactors, turbines, furnaces and structural members, and should be covered by the demolition and renovation regulations. Since demolition and renovation operations can involve ducts insulated with appreciable quantities of friable asbestos material, "ducts" has been added to the list of apparatus that are covered by the amendments.

The comment was made that the quantity of friable asbestos material proposed as the minimum amount for establishing renovation operations as major sources of asbestos subject to the proposed amendments was arbitrary, but should also apply to demolition operations. The Agency explained in the preamble to the proposed amendments that this amount of asbestos is typically contained in a four-unit apartment building, which is the maximum size for apartment buildings excluded from the demolition provisions. Therefore, the minimum quantity of friable asbestos material covered by the demolition and renovation provisions is essentially equivalent. The Agency considered applying regulations only to demolition operations in which more than a specified amount of friable asbestos material was involved, prior to promulgation of demolition provisions on April 6, 1973 (38 FR 8820). This approach was rejected primarily because it would complicate enforcement procedures. However, the Agency realizes that certain commercial buildings contain smaller amounts of friable asbestos material than the lower size cutoff limit proposed for renovating operations. On reevaluation, the Agency concluded that the available information justifies changing the proposed amendment to allow exemption of demolition operations involving less than 80 meters of friable asbestos pipe insulation and less than 15 square meters of friable asbestos material used to insulate or fireproof any duct, boiler, tank, reactor, turbine, furnace or structural member. The owner or operator of a demolition operation desiring this exemption must notify the Administrator, at least 20 days prior to beginning demolition, of the measured or estimated amount of friable asbestos material involved in the demolition. This will permit the exception to be implemented without requiring prior inspection of every site by Agency personnel, which would be an excessive enforcement burden. This differs from the reporting requirements of the renovation provisions of the amendments. The nature of renovation operations necessitates a greater familiarity on the part of the operator with the quantities of friable asbestos materials present than for demolition operations. For this reason, the Agency believes that it is not necessary to require reports from all renovation operations in order to ensure effective enforcement of the renovation provisions that apply to only larger renovation operations.

Several comments were received which stated that operating machinery could be damaged by wetting procedures during certain renovation operations. The wetting during renovation of a heated boiler, near sensitive electric equipment, and over operating machinery in an industrial plant were mentioned as specific examples. One comment also stated that portable local exhaust ventilation systems are effective alternatives to wetting. The proposed amendments have been changed to allow the use of local exhaust ventilation systems when damage to equipment from wetting is unavoidable, provided that the system captures the asbestos particulate material produced during the removal of friable asbestos material and discharges no visible emissions from its exhaust. The Administrator will make determinations, upon request, of whether damage to equipment from wetting would be unavoidable.

Several comments were received which stated that the proposed frequency for submitting to the Agency written notices of intention to perform repetitive renovation work at a single facility was excessive. One commentator suggested that definitions for "emergency renovation" and "routine maintenance renovation" be included, and that a yearly filing of intention to renovate should be allowed for each industrial plant. It is evident from the comments received that some plants perform renovation operations very frequently, such as twice a week. The proposed reporting requirements for such plants would be excessive. The proposed amendment has been changed so that these requirements are reduced, and the applicability of the requirement is more clearly defined by adding more detailed language and definitions for "planned renovation" and "emergency renovation" operations. Additionally, the applicability of the amendment has been clarified by specifying how the quantities of asbestos involved in "planned renovation" and "emergency renovation" are to be determined. The basic characteristic that distinguishes the two types of renovation operations is the degree of predictability of their occurrence. The amount of friable asbestos material that will be removed or stripped within a given period of time can be predicted for planned renovation operations, including both scheduled and non-scheduled operations, whereas no such prediction can be made for emergency renovation operations. The given period of time for predicting purposes has been specified to be between 30 days and one year for planned renovation operations involving individually non-scheduled operations. A reporting time shorter than 30 days would require the submission and review of a large number of reports, and predictions over periods longer than one year could give inaccurate predictions of friable asbestos material to be removed. In emergency renovation operations, the amount of friable asbestos material that is subject to the amendment is the total amount of such material that will be removed or stripped as a result of the individual emergency.

One commentator stated that the proposed amendment covering renovation could be circumvented by the carrying out of small portions, which are individually not subject to the amendment, of a larger operation. Section 61.17 has been added to the General Provisions to explicitly prevent this potential circumvention and to apply in general to circumvention of all standards promulgated under this part.

One commentator stated that a requirement in § 61.22(d)(2)(vi) of the proposed amendments was inconsistent and should be revised. This section required that friable asbestos material removed from buildings greater than 50 feet in height be transported to the ground via dust-tight chutes or containers. The cited inconsistency arises because this requirement applied at all heights, including those less than 50 feet, for a building 50 feet or gretaer in height, whereas it did not apply to buildings less than 50 feet in height. The requirement has been changed so that it applies only to materials that have been removed or stripped at more than 50 feet above ground level.

Several minor changes have been made in response to comments. Language has been added to allow delivery of notices of intention to renovate or demolish to the Administrator by means other than the U.S. mail. There is a minor clarifying language change between § 61.22(d)(2)(i) of the proposed demolition provisions and the corresponding provision, § 61.22(d)(4)(i), of the regulations promulgated herein. A comment suggested the term "adequately wetted" should be defined and differentiated from "thoroughly wetted," since both terms appeared in the proposed amendments. The use of these terms has been reevaluated, and a definition of "adequately wetted" has been added. The term "thoroughly wetted" has been deleted and the term "adequately wetted" has been used throughout.

The Agency has made a revision in the proposed requirement [§ 61.22(d)(1)] for notification of intention to perform renovation or demolition operations. An additional reporting requirement for the name and location of the waste disposal site where demolition and renovation waste will be deposited has been added to assist in enforcing the waste disposal provisions of the amendments.

Spraying. During review of the amendments within the Agency, a question arose concerning whether the waste generated by operations that use spray-on materials which contain less than one percent of asbestos by weight to insulate or fireproof buildings, structures, pipes and conduits was covered by the asbestos waste disposal amendment [§ 61.22(j)]. The spraying provisions do not apply to such operations, though reports of the operations were required by the standard promulgated on April 6, 1973. Therefore, the waste disposal processes associated with these operations are not regulated by the waste disposal amendments. Based on Agency enforcement experience since promulgation of the standard on April 6, 1973, the required reporting of spraying operations where less than 1 percent asbestos material is used is felt to be unnecessary. Accordingly, the Agency has revised the reporting requirements of paragraph 61.22(e) to apply only to spray-on insulation and fireproofing material that contains more than one percent asbestos by weight.

Waste Disposal. The proposed amendments would have applied directly to all waste disposal sites that accept asbestos waste from any emission source covered under the asbestos standard. The Agency estimated that approximately 2500 disposal sites would be covered. Review of these proposed amendments within the Agency indicated that enforcement would have required a disproportionate commitment of Agency resources. Alternative means of controlling asbestos emissions from waste disposal sites were therefore examined.

The number of acceptable waste disposal sites that meet the criteria in § 61.22(j)(3) of the proposed amendments, which are similar to the criteria for sanitary landfills, has increased significantly within the past several years and the trend is continuing in that direction. This trend is noted in a recent publication ("Waste Age," January 1975). This indicates that acceptable sites (i.e., private and municipal sanitary landfills) which follow practices that reduce asbestos emissions will be available for disposal of asbestos-containing waste. Therefore, it was determined that an effective means of reducing emissions from waste disposal sites without undue enforcement burdens would be to require already-regulated asbestos waste generators to dispose of asbestos-containing wastes at properly operated disposal sites. This is provided for in the amendments herein promulgated.

The Agency's greatest concern is with disposal sites which accept large quantities of asbestos waste. In most cases, companies which generate large quantities of asbestos-containing waste also own and operate their own disposal sites because of convenience and economics. For example, all domestic asbestos mills operate their own tailings disposal sites. The Agency anticipates that these large waste generators will operate their disposal sites in the future in compliance with the proposed § 61.22(l) in order to meet the requirement that they dispose of their waste at a acceptable sites.

Inactive disposal sites may also be major emission sources if they contain large amounts of asbestos waste. It is likely that at inactive sites containing small amounts of asbestos waste the asbestos is covered by non-asbestos waste, and the chance of significant asbestos emissions is small. It was decided to require that those inactive sites which are known to contain large quantities of asbestos comply with the standards specified in section 61.22(l) to reduce asbestos emissions. This category of asbestos waste disposal sites is usually operated by the sources that generate the asbestos-containing wastes, as noted above. Accordingly, the amendments promulgated herein apply to inactive disposal sites that have previously been operated by certain sources covered by the asbestos standard. The owner of such an inactivated site must comply with the amendments regardless of whether or not he generated the waste or operated the disposal site when it was active. This category of sites includes asbestos mill tailings disposal sites, and the large disposal sites at asbestos manufacturing and fabricating plants which have caused concern in the past. The owners or operators of spraying, demolition and renovation operations have not operated disposal sites in the past and are not expected to do so in the future. Due to the nature of such operations, the wastes generated are deposited at waste disposal sites which accept mostly non-asbestos-containing waste. As a result, the asbestos waste is effectively covered, thereby preventing emissions even in open dumps. For these reasons, inactive waste disposal sites that have been used by spraying, renovation and demolition are not regulated.

The amendments promulgated herein will control inactive asbestos waste disposal sites that contain large quantities of asbestos waste. The Agency's enforcement resources will be more effectively utilized since approximately 2000 waste disposal sites will not be directly regulated by the promulgated amendments. This should facilitate enforcement and protection of the public health.

The comment was made that the proposed permanent posting of warning signs at inactive asbestos waste disposal sites would be overly restrictive. The warning signs were intended primarily to warn the general public of the potential hazards that could result from creating dust by such disturbances as walking on exposed asbestos waste. If the disposal site is properly covered over as required by the alternative methods of complying with the proposed amendment for waste disposal sites, such minor disturbances will not generate asbestos emissions. Accordingly, the proposed amendment has been changed, and warning signs are not required if an inactive disposal site applies and properly maintains a covering of compacted non-asbestos-containing material at least 60 centimeters (ca. 2 feet) in depth, or at least 15 centimeters (ca. 6 inches) in depth with a cover of vegetation. The proposed amendment would have also required that active asbestos waste disposal sites post warning signs. The amendments promulgated herein do not apply directly to active disposal sites, and the specified operating practices for acceptable disposal sites do not require the posting of warning signs provided an appropriate cover of at least 15 centimeters (ca. 6 inches) of non-asbestos-containing material is applied to the active portion of the site at the end of each operating day. Comments were received that suggested the Agency should allow the use of existing natural barriers as substitutes for fences that are intended to deter access to some types of asbestos waste disposal sites. The Agency agrees that certain natural barriers, such as deep ravines and steep cliffs, can be as effective as fences in deterring access. The proposed amendment has been changed to suspend the requirements for fences, and also warning signs, when a natural barrier provides an adequate deterrent to public access. Upon request and supply of appropriate information, the Administrator will determine whether a specific type of fence or a natural barrier adequately deters access to the general public. In response to another comment, the proposed amendment for fencing of asbestos waste disposal sites has been revised to allow fences to be placed either along the property line of an affected source that contains a waste disposal site or along the perimeter of the disposal site itself. Either type of fence provides the necessary deterrent to public access to the disposal site.

Several comments were received on the proposed prohibition of incineration of containers that previously contained commercial asbestos. One commentator stated that the prohibition seemed undesirable because asbestos is thermally degraded at a temperature of 600° C. The Agency considered: (a) the uncertainty that the feed material to an incinerator will be uniformly heated to the combustion chamber temperature, (b) the uncertainty concerning the decomposition temperature of asbestos, and (c) the results of a stack gas test that detected emissions of asbestos from a sintering process in which the temperature attained was well above 600° C, in evaluating the comment. The Agency concluded that the available data do not justify changing the proposed regulation on grounds that the asbestos is thermally degraded in the combustion process. Another comment suggested that incineration should be permitted, provided there are no visible emissions of asbestos particulate matter from the incinerator. Information presented to the Agency after proposal indicated that some small incinerators, such as those operated by asbestos manufacturing plants, can be operated with no visible emissions. The proposed prohibition on incineration of containers that previously held commercial asbestos has been deleted. The provisions of the amendments for the disposal of asbestos-containing waste materials apply in particular to the disposal of containers that previously held commercial asbestos. Therefore, these containers can be incinerated under the amendments, provided the incineration operation does not discharge visible emissions.

Two commentators suggested that the proposed amendments should not require that EPA warning labels be attached to containers of asbestos waste in addition to the warning labels specified in regulations issued by the U.S. Department of Labor, Occupational Safety and Health Administration (OSHA). The Agency agrees that both labels adequately convey the desired information; therefore, the proposed amendment has been changed to allow the OSHA warning label to be used in place of the EPA warning label.

Several commentators requested that the proposed alternative method of compliance included in the asbestos waste disposal amendments, which specified that the waste be formed into non-friable pellets, be changed to accommodate shapes other than pellets. The precise size and shape of the processed, non-friable waste is not important, and the amendment has been reworded to explicitly permit the forming of asbestos wastes into pellets or any other shapes.

A comment was made during review within the Agency that asbestos-containing wastes subject to the proposed amendment are sometimes used to surface roadways and that this practice should be prohibited. The Agency agrees that the use of asbestos-containing wastes on roadways can cause asbestos emissions similar to those caused by the use of asbestos tailings on roadways, which is prohibited by the asbestos standard. Vehicular traffic on roadways can pulverize asbestos waste and liberate fibers that can become airborne in the wake of moving vehicles and by the wind. The use of asbestos-containing wastes has therefore been prohibited from use on roadways.

The proposed amendment for waste disposal at asbestos mills included a provision requiring no visible emissions to the outside air from the deposition of asbestos ore tailings onto a disposal pile. An alternative method of compliance required that the waste be adequately wetted with a dust suppressant agent prior to deposition. Two commentators stated that an exemption from the wetting requirement of the alternative method is needed when the temperature at the disposal site is below freezing, to prevent freezing of the tailings and permit continued operation of the asbestos mill at such low temperatures. The investigation carried out by the Agency prior to proposal of the amendment indicated that wetting of asbestos tailings is the only presently available method for effectively controlling particulate emissions from the deposition operation. In response to the comments received, the Agency further investigated the cold weather operational problems of disposal systems for wetted asbestos tailings. Discussions were held with operators of three Canadian asbestos mills that frequently operate under cold weather conditions and have installed tailings wetting systems, with a firm that is experienced in designing systems to suppress dust generated by materials conveying operations, and with several non-asbestos mineral mining facilities that operate wetting systems for crushing and conveying operations. The investigation revealed that several Canadian asbestos mills are presently experimenting with wet tailings disposal systems to extend operation to temperatures substantially below freezing. However, the Agency is aware of no such system that has operated in a continuous manner at temperatures below −9.5°C (15°F). Accordingly, the Agency has concluded that wet tailings disposal systems for asbestos mills are not available for disposal site temperatures below −9.5°C (15°F), and the proposed amendment has been changed to provide an exemption for wetting of tailings below this temperature. Only one existing domestic asbestos mill is expected to use the exemption to a significant extent. An examination of hourly temperatures representative of the location of that plan, and extending over a period of one year, showed that hourly temperatures are below 15°F for approximately 7 percent of the time.

Asbestos emissions at asbestos mill tailings disposal piles are contributed by the tailing conveying operation, the deposition operation, and wind entrainment of asbestos-containing particulate from the surface of the disposal pile. The first emission source is subject to previously promulgated regulations (38 FR 8820), and the latter two sources are subject to the amendments promulgated herein. The major sources of asbestos emissions from process gas streams at asbestos mills, namely effluents from crushers, dryers and milling equipment, are also covered by the previously promulgated regulations (38 FR 8820). The amendments promulgated herein, including an exemption from wetting of asbestos tailings at temperatures below −9.5° C (15° F), together with the standards promulgated on April 6, 1973 (38 FR 8820), represent use of the best available technology for control of emissions from asbestos mills. This is consistent with the determination of the Administrator that best available technology should be used to control major sources of asbestos emissions to protect the public health with an ample margin of safety.

The reporting format of Appendix A has been changed by the addition of paragraphs "C" and "D", to accommodate the addition of disposal of asbestos-containing wastes and certain inactive asbestos waste disposal sites to the amendments. The additional information required is essential for determining compliance with the regulations. Appendix A has also been revised into a new computer format which will promote more effective enforcement of the regulations. Section 61.24 has been revised to reflect the additional reporting information requested in Appendix A.

ADDITIONAL COMMENTS

Manufacturing and Fabrication. One comment questioned the need for including asphalt concrete manufacturing plants in the proposed amendments. The rationale for including asphalt concrete plants as major sources of asbestos is discussed in the background information document for the proposed amendments (EPA–450/2–74–009a). Two commentators suggested that the manufacture of asphalt concrete containing less than 3 to 5 percent asbestos in the total mixture should be exempt from the regulations. However, asbestos asphalt concrete typically contains 1 to 3 percent asbestos, and the Agency determined that asbestos asphalt concrete operations using even these low percentages of asbestos are major sources. No data or information were received that would indicate asphalt concrete plants are not major sources, and the regulations promulgated herein apply to such sources. The Agency received two comments that the individual emission sources within an asbestos asphalt concrete plant which are subject to the proposed amendments should be specified. The Agency feels that revisions are not necessary. Only component operations that may emit asbestos are covered by the provisions; for example, if no asbestos is added to the aggregate dryer, the emissions from the dryer alone are not covered.

The possibility that the enforcement of the amendments promulgated herein for asphalt concrete plants may be in conflict with the enforcement of new source performance standards for asphalt concrete plants was raised by one commentator. It is possible that both the new source performance standard and the national emission standard for asbestos will apply simultaneously to emissions from some operations at some new and modified plants. Where this occurs, the visible emission standard promulgated herein applies to asbestos particulate matter, even though it is more restrictive than the opacity regulation of the new source performance standard. A more stringent standard is justified when asbestos is being processed because of the hazardous nature of asbestos.

Comments were received that the proposed definition of "fabricating" needed to be clarified. The Agency reviewed the definition and determined that changes in the definition are not necessary. Fabricating includes any type of processing, excluding field fabrication, performed on manufactured products that contain commercial asbestos. The Agency acknowledges that some component processes of asbestos fabricating operations could generate visible emissions in such a manner that the visible emissions do not contain asbestos generated by the process, though the commentators did not cite any specific examples. The Agency has observed this type of process in asbestos manufacturing operations. For example, visible emissions of organic materials are sometimes generated during the curing of asbestos friction products in operations where asbestos is bound into a matrix of non-asbestos material but the asbestos is not transferred into the emission stream. Such operations are in compliance with the standard of no visible emissions containing particulate asbestos material.

One commentator stated that some field fabrication operations release significant amounts of asbestos. The Agency's investigation prior to proposal of the amendments showed that there is only limited field fabrication of asbestos products other than insulating products. The fabrication of friable asbestos insulation was determined to be the only major asbestos field fabrication source, and this is regulated by prohibiting the use of such materials after the effective date of the amendments promulgated herein. In the judgment of the Administrator, the comment did not contain sufficient information to justify including other categories of asbestos field fabrication in the amendments. One commentator recommended that the Agency impose a standard of 0.03 grain per cubic foot for asbestos emissions in addition to the no-visible-emission standard. It is the judgment of the Agency that there are no sufficiently reliable emision measurement techniques to provide a basis for such a numerical standard and the setting of numerical standards should be delayed until accurate asbestos measuring techniques are available.

Demolition and Renovation. Comments were received which suggested that the proposed renovation provisions should not apply to operations carried out within buildings, or to operations regulated by the Occupational Safety and Health Administartion (OSHA) for worker exposure to asbestos. The Agency recognizes that there may be less asbestos emissions from stripping of friable asbestos materials within a structure than from stripping in an unenclosed area. However, asbestos from the stripping operation carried out within a building or structure can be discharged into the outside air from building ventilation systems, windows and doors. Further, the disposal of friable asbestos waste materials generated by renovation operations, which includes the transport of waste materials to a disposal site, is an emission source that needs to be controlled regardless of whether the renovation is performed in the outside air or in buildings. In the judgment of the Administrator, the control of such asbestos emissions is necessary and is part of the best available control technology. The OSHA regulations (29 CFR 1910.93a) require that, ". . . insofar as practicable . . .," asbestos material be removed while wetted effectively to prevent emission of asbestos in excess of the specified OSHA exposure limit, but also specifically require that employees shall be provided with respiratory equipment for all spraying, demolition and removal of asbestos materials. The purpose of the OSHA standard, to protect employees' health, can be achieved by the use of respiratory equipment, even in those situations where wetting is not implemented and emissions may produce concentrations in excess of the OSHA exposure limit. The extent to which the resulting concentrations in the outside air are protective of public health is unknown. Accordingly, the proposed renovating provisions do not exempt operations that are controlled by OSHA regulations.

Two commentators stated that the alternative to the wetting requirement in the demolition provisions at sub-freezing temperatures should be allowed at all temperatures. In contrast, another commentator suggested that suspension of the wetting requirements at sub-freezing temperatures should be subject to a permit procedure that would discourage demolition at sub-freezing temperatures. The alternative was proposed because, in the judgment of the Agency, worker safety would be unduly jeopardized by the unsafe footing caused by ice formation from water use under freezing conditions. The proposed alternative is less restrictive on demolition contractors than a second course of action that was considered, namely the prohibition of demolition under freezing conditions. The proposed alternative suspends only a portion of the wetting requirements under freezing conditions. Pipes, ducts, boilers, tanks, reactors, turbines, furnaces and structural members insulated or fireproofed with friable asbestos materials must be removed from the building in sections, to the maximum extent practicable, before wrecking of the building. The stripping of asbestos materials from the previously removed sections must be accompanied by wetting at all temperatures, and the resulting asbestos waste materials must be wetted at all temperatures. These procedures do not jeopardize worker safety. Therefore, the promulgated demolition provisions are based on the use of the best available emission control methods at all temperatures, and these methods are different for non-freezing and freezing conditions.

Another comment indicated that sprayed fireproofing was the only type of asbestos material that could cause asbestos emissions to the atmosphere during demolition operations, and that molded insulation is not readily released into the air. The Agency has inspected both types of materials and has found that some types of molded insulation and plaster that contain asbestos are friable. Therefore, buildings containing these materials are covered by the amendments promulgated herein.

Comments were received that the Agency has a responsibility to develop asbestos measurement methods and determine by use of measurement methods whether demolition is a major source of asbestos emissions. The Agency keeps abreast of newly developed measurement techniques in the asbestos industry, and the development of asbestos measurement techniques is currently being funded by the Agency. No new information on measurement techniques was received in the comments. The Agency previously made the determination that building demolition is a major source of asbestos emissions, and no new information has been submitted to demonstrate that it is not a major source. Demolition and renovation operations generate short-term exposures of urban populations to asbestos. Since promulgation of the demolition regulations on April 6, 1973, new biological evidence supporting the significance of single short-term exposures of asbestos has been obtained. One-day inhalation exposures in animal experiments have produced an increase in the incidence of mesothelioma. (Wagner, J. C., Berry, G., and Timbrell, V., "The Effects of the Inhalation of Asbestos in Rats", *Br. J. Cancer* 29, pp. 252-269, 1974). A copy of this article is available for inspection at the Public Information Reference Center, Room 2404, Waterside Mall, 401 M Street, SW, Washington, D.C. 20460. It can be concluded that human asbestos exposure for periods typically required to perform demolition and renovation operations is hazardous. Therefore, the Agency has not changed its prior determination that building demolition is a major source of asbestos emissions. Another commentator was concerned that the demolition sources now covered by the asbestos standard as major sources were not defined as major sources by the National Academy of Sciences (NAS) study, which was cited by the Agency as a basis for the demolition regulation. The NAS study did not define categories of asbestos materials other than sprayed fireproofing as major emission sources because data were available at that time on fireproofing only. The Agency had concluded prior to proposing asbestos standards on December 7, 1971 that any friable asbestos material used for insulation or fireproofing has a comparable potential to create asbestos emissions upon demolition or renovation as sprayed fireproofing, and therefore these materials are also covered by the regulations.

Several comments were received stating that the definitions of "friable asbestos material," "asbestos," and "asbestos material" are vague and subjective and remain constitutionally deficient for a regulation enforceable by criminal proceedings. The Agency reevaluated the definitions and concluded that they are sufficiently clear that the owners or operators subject to the amendments can reasonably be expected to understand these terms. Owners or operators should be able to identify covered material and comply with the regulations on the basis of the definitions supplied.

Comments were made suggesting the Agency describe more specifically a proper wetting operation. The purpose of the wetting requirements is to reduce the amount of asbestos dust generated during demolition operations. Many different procedures would accomplish this; therefore, the Agency believes that specifying such procedures is neither necessary nor appropriate. A new definition of "adequately wetted" was added to the regulations promulgated herein. The Agency believes that owners or operators of demolition operations are familiar with proper wetting procedures.

Two comments were made stating that the proposed demolition and renovation amendments are not emission standards and that asbestos emissions must be proved in determining compliance with the regulations. Congress has specified that EPA should set emission standards for hazardous air pollutants. EPA, charged with implementing this requirement, has determined that the term "emission standard" includes work practice requirements designed to limit emissions. The position taken by the Administrator on this issue in the promulgation of the original regulations on asbestos on April 6, 1973 (38 FR 8820) is unchanged here. The demolition and renovation regulations require certain work procedures to be followed. These methods of control are required because of the impossibility at this time of prescribing and enforcing allowable numerical concentrations or mass emission limitations. One difficulty in prescribing a numerical emission standard is the relative inaccuracy of asbestos analytical methods. Dr. Arnold Brown, testifying in a recent court case involving asbestos emissions [*United States et al.* v. *Reserve Mining Co. et al.*, 498 F.2d 1073, 1079, (8th Cir., 1974)] stated, "It is reasonable to assume an error in the count of fibers in both water and air of at least nine times on the high side to one-ninth on the low side." Further testifying on the same subject, Dr. Brown stated, ". . . I do not recall having been exposed to a procedure with an error this large, and which people have seriously proposed a number based on this very poor procedure." Moreover, there is no place to measure the total emissions from a demolition or renovation operation. The Agency has determined that violations of the work practices specified in the demolition section will result in emissions of asbestos. Considering these facts, the prescription of work practices is not only a legally permissible form of an emission standard, but also the only practical and reasonable form.

Waste Disposal. A number of commentators questioned the relationship between the proposed no-visible-emissions requirements in the proposed asbestos waste disposal provisions and the alternative methods for complying with the requirement. The following points were included in the comments:

1. Can any of a variety of waste disposal methods be used to meet the no-visible-emissions limit?
2. Various other methods of disposal should be specified as alternatives.
3. The inclusion of a no-visible-emissions requirement in portions of the alternative methods of compliance is a paradox.
4. Various alternatives are either not feasible or are unnecessary for some specific waste disposal operations.

As stated in §§ 61.22 (j) and (k) of the proposed and promulgated amendments, a requirement for affected sources that dispose of asbestos waste is no visible emissions during waste disposal operations. This provides affected sources flexibility in developing and using those disposal techniques most suitable to individual needs. The Agency recognizes that the best available disposal methods for some of the sources may not be capable of preventing visible emissions during a minor portion of some of the disposal operations. Therefore, alternative methods of compliance that represent the best available disposal methods have been included in the regulations. Sources are not required to use these methods; they may use other methods that achieve no visible emissions. However, sources may elect to use one of the specified alternatives. Some of these alternatives result in no visible emissions; others may not. For those alternative methods that may not be capable of preventing visible emissions during all portions of the waste disposal process, a requirement has nevertheless been included that there be no visible emissions from those portions of the process that can achieve this performance level. The listing of a particular method of waste disposal as an alternative method of compliance does not imply that the method is universally applicable or that the use of the method is necessary to achieve no visible emissions.

Some comments questioned whether the proposed amendments would apply to asbestos waste disposal sites that were inactivated prior to the publication of the proposed amendments. Regulations established under section 112 of the Act are applicable to both existing sources and new sources. The amendments cover previously inactivated sites as well as sites that become inactive in the future. However, the proposed amendments have been revised as discussed in "Changes to the Proposed Amendments" so that only owners of sites which have been operated by asbestos mills, manufacturing plants, and fabricating plants subject to the asbestos standard must comply with the asbestos amendments proposed herein for inactive asbestos waste disposal sites.

Several commentators suggested that certain types of asbestos waste disposal sites should be excluded from the proposed amendments, depending upon the the rate at which asbestos waste is deposited at the site, the percentage of the total waste that is asbestos, the friability of the asbestos waste, and the extent to which the site is in active operation. These comments were considered, but no changes in the proposed amendments were made as a result of the Agency's reevaluation. It would be extremely difficult to enforce regulations that depend on the rate or asbestos content of waste deposition. Further, the provisions promulgated herein shift the focus of the waste disposal requirements away from the site operator to the generator of the waste. Because of this, the burden of the requirements on a waste disposal site operator who accepts only a very small quantity of asbestos waste, and who the commentators desire to exclude from the regulations, is largely removed.

A comment was made that the proposed amendments could cause considerable hardship to small users of asbestos because some waste disposal sites may no longer accept asbestos wastes. There are an estimated 5,000 waste disposal sites in the U.S. which meet the standards of a sanitary landfill. A properly operated sanitary landfill complies with the soil-covering requirements of the amendments, and therefore will be affected only slightly by handling asbestos wastes. Accordingly, the Agency believes that small manufacturers and users of asbestos will not encounter severe problems in complying with the amendments for waste disposal sites.

Two commentators were concerned that the proposed waste disposal provisions would cause serious problems in contract hauling arrangements; and in the use of private landfills, municipal landfills, and waste disposal sites leased by generators of the asbestos waste. Since the generator of the waste has the direct responsibility for compliance during the transport of waste and for disposing of the waste at a properly operated disposal site, the Agency believes that problems in contract hauling arrangements can be avoided if the generator institutes proper waste handling practices. The Agency also believes that the deletion in the promulgated amendments of some of the proposed requirements for posting of warning signs will remove many of the potential problems that were of concern. Further changes to the proposed amendments were judged unnecessary because they impose few additional requirements on disposal sites, such as municipal sanitary landfill sites, that are properly operated.

A comment suggested that bags which previously held commercial asbestos should be exempt if the bags have been cleaned sufficiently so that shaking the bags will not generate visible emissions of asbestos particulate matter. Even if such wastes do not produce visible emissions during the subsequent processing, transporting and depositing operations at a waste disposal site, there is a need for ensuring proper ultimate waste disposal because such bags still are likely to contain residual asbestos. The Agency believes that regulations are needed for this purpose and also for the purpose of ensuring that emissions from the cited method of cleaning bags are properly controlled. Accordingly, the disposal of bags that have been cleaned in the manner described has not been exempted from the amendments promulgated herein.

Comments were received which stated that the proposed waste disposal provisions would probably preclude the disposal of waste asbestos cement pipe in commercial landfills. It is the Agency's judgment that commercial landfills which comply with the regulations will be available. Further, the pipe crushing operation that is conventionally carried out during compaction at the disposal site can alternatively be performed and controlled by gas cleaning equipment at a stationary crusher.

MERCURY

CHANGES TO PROPOSED AMENDMENTS

The proposed definition of "sludge dryer" has been revised to indicate more clearly that only sludge drying operations that are directly heated by combustion gases are covered by the amendment. The amendment does not apply to devices that are indirectly heated, such as secondary mercury recovery furnaces.

A comment suggested that daily sludge sampling and analysis should be required to reveal potential variations in mercury content of the sludge. The daily averages of sludge mercury content are not expected to vary significantly, and the Agency believes that the added cost to the owners or operators of such sources for daily sampling and analysis of sludge is not justified. Variations in mercury concentration of sludge can occur over longer periods of time, however, and a requirement has been added that all facilities for which emissions are in excess of 1600 grams per day as determined by the initial compliance test must monitor on a yearly basis with the sludge sampling method. In addition, the Agency has authority to request sludge sampling and analysis, or stack sampling, and will exercise this authority whenever there are indications that a change in mercury concentration of the sludge has occurred that would significantly increase mercury emissions.

One commentator suggested several revisions to procedures in the proposed sludge testing method, Method 105. The procedures were reevaluated, and the method has been changed where appropriate. The proposed section 3.1.3 of Method 105 specified a 10 percent solution of stannous chloride as an alternative to stannous sulfate. One comment stated that it was inappropriate to require any solution percentage. The Agency agrees, and the requirement has been deleted. Another comment suggested that the required use of mercuric chloride of Bureau of Standards purity to prepare the mercury stock solution is not necessary because the precision of the method does not demand such purity. The Agency agrees with this comment, and the method has been changed to permit the use of reagent grade mercuric chloride. The comment was made that mercuric solutions should not be prepared in plastic containers. The Agency is in general agreement with this and a statement to this effect has been added to Method 105. Section 4.1.1 of the method specifies that the, "... sampling devices, glassware and reagents should be ascertained free of significant amounts of mercury." A major source of mercury contamination occurs when sample solutions and reagents come into contact with mercury-contaminated containers. A comment indicated that a specific quantity should be stated to indicate how much mercury is considered "significant." The Agency believes that the specification of an amount of mercury contamination is inappropriate because such an amount would be very difficult to measure. The mercury contamination of containers can be reduced to an insignificant amount by properly cleaning such containers before use. The proposed paragraph has therefore been changed to specify that sample containers shall be properly cleaned before use by rinsing with nitric acid, followed by rinsing with distilled water. Another comment suggested that the possible interferences with the analysis of mercury in sludge should be delineated and that preventative measures should be given. In response, two references in which such interferences are discussed have been added to Method 105.

ADDITIONAL COMMENTS

The Agency has determined that an ambient air mercury concentration of 1 microgram per cubic meter averaged over a 30-day period will protect the public health with an ample margin of safety. The maximum allowable mercury emission for sludge incineration and drying plants was calculated, by use of meteorological modeling techniques using restrictive dispersion conditions, that would not result in this ambient concentration being exceeded. The resulting maximum allowable emission is 3200 grams of mercury per day. Numerous comments were received that questioned the methodology used to calculate this emission limitation. Several comments questioned the derivation of the ambient concentration of 1 microgram per cubic meter, 30-day average, and indicated that this level should be lower. The Agency evaluated these comments, but determined that no new information had been presented that had not been previously considered in the derivation of this allowable concentration. Another commentator stated that the restrictive meteorological conditions used for sewage sludge incineration and drying plants do not represent the "worst case" meteorological conditions, and discussed a specific existing facility as an example. The Agency analyzed this comment considering the meterological conditions and topography at the specific site mentioned in the comment and concluded that, even with a mercury emission of 3200 grams per day, the public will be protected with an ample margin of safety at the cited facility. A copy of the Agency response to this comment is available for inspection at the Public Information Reference Center, Room 2404 Waterside Mall, 401 M St., Wash., D.C. 20460. The Agency knows of no sludge incineration or drying facility where the ambient guideline level of one microgram of mercury per cubic meter, 30-day average, will be exceeded. The following comments stating that the proposed emission limit is too stringent or that additional studies are needed before promulgation were received:

1. The proposed emission limit provides an excessive safety factor for some plant locations.
2. The proposed emission limit should be based on plant size, allowing larger emissions for larger plants.
3. The intent of the proposed amendment seems to be to limit the size of new plants and require disposal of sludge by alternative methods.
4. The regulation seems to be excessively stringent in order to simplify the administration of the standard for multiple sources.
5. There is not enough information to justify promulgating the amendment at this time; the promulgation should be delayed until further studies are made.

In contrast, several comments suggested that the proposed emission limit was too lenient. Since the emission limitation is related to an ambient concentration, it would be inappropriate to allow higher emissions for larger plants. Concerning plant location, it would be impractical to specify a different emission limitation for each present or future plant location which reflected local meteorological conditions. Moreover, section 112 of the Act provides for a national standard, and the Administrator has set this standard at a level which will prevent exceeding the specified safe ambient level at all locations. The Agency determined that there is sufficient information to justify promulgating emission regulations for sludge incinerators and no data or information were presented that would justify changing the mercury emission limit of 3200 grams per day.

A comment was made that the impact of multiple sources of mercury emissions was not addressed in the derivation of the national emission standard for mercury. While the standard does not include special provisions for multiple sources, it does provide a large safety factor at many sites and this provides a measure of protection against the multiple source problem. The Agency knows of no location where existing multiple sources of mercury will cause the ambient guideline level of one microgram of mercury per cubic meter, 30-day average, to be exceeded. The Agency must approve all new construction or modification of sources regulated by the mercury standard. During the review of such construction or modification, the Agency will assess the impact that the new or modified sources have on the ambient mercury concentration. If the Agency discovers a situation where a source can cause the guideline ambient concentration to be exceeded, the national emission standard will be reevaluated. In addition, local planning agencies have the capability to prevent multiple source pollution problems through proper land use planning. The Agency urges these local agencies to consider the impact of multiple sources on such problems as mercury air pollution when making planning decisions.

Comments were received that questioned whether all sludge incineration and drying plants are major sources of mercury emissions that must demonstrate compliance with the standard. All of these facilities have the potential to emit mercury; the amount of mercury that is emitted depends upon the mercury content of the sludge and the sludge incineration or drying rate. Accordingly, all such facilities must demonstrate compliance with the emission limitation promulgated herein.

A comment was received that the economic impact of the proposed amendments on some large facilities may be large, since there may be few or no alternatives for sludge disposal. The Agency estimates that the largest mercury emission from an existing sludge incinerator or dryer is approximately 500 grams per day, which is approximately one-sixth of the maximum allowable emission. The time period over which sludge generation would increase in excess of six-fold should provide sufficient lead time for planning an economically feasible alternate disposal method, if it is required. The Agency therefore does not foresee a significant economic impact for the near future at any sludge incineration or drying plant.

Several comments stated that other sources such as ore processing plants, mercury compound manufacturing plants, industrial waste incinerators, coal-fired power plants, and rooms painted with mercury-containing paints should be investigated and regulated if necessary. The Agency previously investigated mercury emissions from nonferrous smelting plants, secondary mercury production plants, coal-fired power plants, and solid waste incineration plants, and determined that these sources do not emit mercury in such quantities that they are likely to cause the ambient mercury concentration to exceed one microgram per cubic meter. The Agency has regulated all sources that may reasonably be expected to cause an ambient mercury concentration of as much as one microgram per cubic meter, 30-day average. However, the Agency will continue a policy of investigating any source of mercury that it has reason to believe has the potential to endanger the public health.

Another comment stated that the Agency should give specific suggestions, or references should be provided, for disposing of mercury-containing sludges on land in a manner that would protect water resources. The Agency's Office of Water and Hazardous Materials is preparing technical publications on various alternatives for the disposal of sludges, and such materials should be available in the near future.

Several comments were made on the mercury collection efficiency of water scrubbers. One commentator suggested that the mercury collection efficiency of individual water scrubbers should be assumed to be zero for purposes of determining compliance, until positively proven otherwise. Another commentator stated that the proposed sludge sampling method should take into account the amount of mercury that would be collected by a scrubber. The Agency has determined that the requirements of the standard are adequate. No credit for mercury removed by water scrubbers is allowed when compliance is determined by sludge sampling and analysis; however, if the mercury stack measurement method is used to determine compliance, only the amount of mercury emitted to the outside air is measured and any mercury collection by the system is taken into account. The Agency has determined that sludge sampling and analysis can be used as an alternative method to determine maximum mercury emissions, because it is sufficiently accurate. The method is also inexpensive when compared to a complete stack test.

The following comments were received which suggested changes to Method 105 for sludge sampling:

1. A 5 percent potassium permanganate solution is difficult to prepare, and a saturated solution should be required.

2. Potassium permanganate should be used to stabilize mercury solutions.

3. Hydroxylamine hydrochloride can be used in place of the uncommon salt sodium chloride-hydroxylamine sulfate to reduce excess potassium permanganate.

Solutions of 5 percent potassium permanganate can be prepared at room temperature. The Agency has no experience in using potassium permanganate to stabilize mercury solutions, and has not used hydroxylamine hydrochloride to reduce excess potassium permanganate. The method has proved to be satisfactory without the use of the suggested reagents. The Agency believes that the suggested changes are not necessary and the method has not been revised to accommodate these suggestions.

ENVIRONMENTAL AND ENERGY IMPACT

Environmental impact statements must accompany national emission standards for hazardous air pollutants approved for proposal after October 14, 1974. The amendments recommended for promulgation were approved for proposal prior to this date, and an environmental impact statement has not been prepared. The environmental impact of the standards has been assessed, however, and is discussed in the background information document (EPA-450/2-74-009a) for the proposed standards and in the preamble (39 FR 38064) to the proposed standards.

The energy impact resulting from the control of asbestos waste disposal operations at asbestos emission sources and at waste disposal sites is expected to be insignificant since this waste is already collected and deposited at waste disposal sites. Only a relatively small quantity of additional waste material is generated as a result of better control of particulate emissions from manufacturing and fabrication sources covered by the standard. The major energy impact of the amendments is that resulting from the operation of fabric filtration devices at manufacturing and fabrication plants. It is estimated that approximately 170 baghouses of 1000 acfm capacity will be required to comply with the amendments. The operation of these control devices will require the consumption of 2.5 million kilowatt hours per year, which is equivalent to 3900 barrels per year of Number 6 fuel oil at the power generating station. The energy impact resulting from the NESHAPS amendment is small and is justified by the increased control of asbestos emissions.

There is no energy impact that results from the regulation of mercury emissions from sludge incinerators and dryers.

Effective upon promulgation.

(Sec. 112 and 114 of the Clean Air Act, as amended (42 U.S.C. 1857c-7 and 9))

Dated: October 3, 1975.

JOHN QUARLES,
Acting Administrator.

Part 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

1. The table of sections is amended as follows:

Subpart A—General Provisions

Sec.

* * * * *

61.17 Circumvention.

* * * * *

Subpart B—National Emission Standard for Asbestos

* * * * *

61.25 Waste disposal sites.

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Subpart E—National Emission Standard for Mercury

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61.54 Sludge sampling.
61.55 Emission monitoring.

* * * * *

Appendix B—Test Methods

* * * * *

Method 105—Method for determination of mercury in wastewater treatment plant sewage sludges.

2. The authority citation at the end of the table of sections for Part 61 is revised to read as follows:

AUTHORITY: Secs. 112 and 114 of the Clean Air Act, as amended by sec. 4(a) of Pub. L. 91-604, 84 Stat. 1678 (42 U.S.C. 1857c-7, 1857c-9).

Subpart A—General Provisions

3. Section 61.14 is amended by revising paragraph (c) and adding paragraph (d). The revised and added paragraphs read as follows:

§ 61.14 Source test and analytical methods.

* * * * *

(c) The Administrator may, after notice to the owner or operator, withdraw approval of an alternative method granted under paragraphs (a), (b) or (d) of this section. Where the test results using an alternative method do not adequately indicate whether a source is in compliance with a standard, the Administrator may require the use of the reference method or its equivalent.

(d) Method 105 in Appendix B to this part is hereby approved by the Administrator as an alternative method for sources subject to § 61.52(b).

4. A new § 61.17 is added to subpart A as follows:

§ 61.17 Circumvention.

No owner or operator subject to the provisions of this part shall build, erect, install, or use any article, machine, equipment, process, or method, the use of which conceals an emission which would otherwise constitute a violation of an applicable standard. Such concealment includes, but is not limited to, the use of gaseous dilutants to achieve compliance with a visible emissions standard, and the piecemeal carrying out of an operation to avoid coverage by a standard that applies only to operations larger than a specified size.

Subpart B—National Emission Standard for Asbestos

5. Section 61.21 is amended by revising paragraph (j) and adding paragraphs (k), (l), (m), (n), (o), (p), (q), (r), (s), (t), (u), (v), and (w). The revised and added paragraphs read as follows:

§ 61.21 Definitions.

* * * * *

(j) "Demolition" means the wrecking or taking out of any load-supporting structural member and any related removing or stripping of friable asbestos materials.

(k) "Friable asbestos material" means any material that contains more than 1 percent asbestos by weight and that can be crumbled, pulverized, or reduced to powder, when dry, by hand pressure.

(l) "Control device asbestos waste" means any asbestos-containing waste material that is collected in a pollution control device.

(m) "Renovation" means the removing or stripping of friable asbestos material used to insulate or fireproof any pipe, duct, boiler, tank, reactor, turbine, furnace, or structural member. Operations in which load-supporting structural members are wrecked or taken out are excluded.

(n) "Planned renovation" means a renovation operation, or a number of such operations, in which the amount of friable asbestos material that will be removed or stripped within a given period of time can be predicted. Operations that are individually non-scheduled are included, provided a number of such operations can be predicted to occur during a given period of time based on operating experience.

(o) "Emergency renovation" means a renovation operation that results from a sudden, unexpected event, and is not a planned renovation. Operations necessitated by non-routine failures of equipment are included.

(p) "Adequately wetted" means sufficiently mixed or coated with water or an aqueous solution to prevent dust emissions.

(q) "Removing" means taking out friable asbestos materials used to insulate or fireproof any pipe, duct, boiler, tank, reactor, turbine, furnace, or structural member from any building, structure, facility, or installation.

(r) "Stripping" means taking off friable asbestos materials used for insulation or fireproofing from any pipe, duct, boiler, tank, reactor, turbine, furnace, or structural member.

(s) "Fabricating" means any processing of a manufactured product containing commercial asbestos, with the exception of processing at temporary sites for the construction or restoration of buildings, structures, facilities or installations.

(t) "Inactive waste disposal site" means any disposal site or portion thereof where additional asbestos-containing waste material will not be deposited and where the surface is not disturbed by vehicular traffic.

(u) "Active waste disposal site" means any disposal site other than an inactive site.

(v) "Roadways" means surfaces on which motor vehicles travel including, but not limited to, highways, roads, streets, parking areas, and driveways.

(w) "Asbestos-containing waste material" means any waste which contains commercial asbestos and is generated by a source subject to the provisions of this subpart, including asbestos mill tailings, control device asbestos waste, friable asbestos waste material, and bags or containers that previously contained commercial asbestos.

6. Section 61.22 is amended by amending paragraphs (c) and (e), revising paragraphs (b), (d), (f), and (g) and adding paragraphs (h), (i), (j), (k), and (l). The revised and added paragraphs read as follows:

§ 61.22 Emission standard.

* * * * *

(b) Roadways: The surfacing of roadways with asbestos tailings or with asbestos-containing waste that is generated by any source subject to paragraphs (c), (d), (e) or (h) of this section is prohibited, except for temporary roadways on an area of asbestos ore deposits. The deposition of asbestos tailings or asbestos-containing waste on roadways covered with snow or ice is considered "surfacing."

(c) Manufacturing: There shall be no visible emissions to the outside air, except as provided in paragraph (f) of this section, from any of the following operations if they use commercial asbestos or from any building or structure in which such operations are conducted.

* * * * *

(10) The manufacture of shotgun shells.

(11) The manufacture of asphalt concrete.

(d) Demolition and renovation: The requirements of this paragraph shall apply to any owner or operator of a demolition or renovation operation who intends to demolish any institutional, commercial, or industrial building (including apartment buildings having more than four dwelling units), structure, facility, installation, or portion thereof which contains any pipe, duct, boiler, tank, reactor, turbine, furnace, or structural member that is insulated or fireproofed with friable asbestos material, except as provided in paragraph (d)(1) of this section; or who intends to renovate any institutional, commercial, or industrial building, structure, facility, installation, or portion thereof where more than 80 meters (ca. 260 feet) of pipe insulated or fireproofed with friable asbestos material are stripped or removed, or more than 15 square meters (ca. 160 square feet) of friable asbestos material used to insulate or fireproof any duct, boiler, tank, reactor, turbine, furnace, or structural member are stripped or removed.

(1)(i) The owner or operator of a demolition operation is exempted from the requirements of this paragraph provided, (1) the amount of friable asbestos material in the building or portion thereof to be demolished is less than 80 meters (ca. 260 feet) used to insulate pipes, and less than 15 square meters (ca. 160 square feet) used to insulate or fireproof any duct, boiler, tank, reactor, turbine, furnace, or structural member, and (2) the notification requirements of paragraph (d)(1)(ii) are met.

(ii) Written notification shall be postmarked or delivered to the Administrator at least 20 days prior to commencement of demolition and shall include the information required by paragraph (d)(2) of this section, with the exception of the information required by paragraphs (d)(2) (iii), (vi), (vii), (viii), and (ix), and shall state the measured or estimated amount of friable asbestos material used for insulation and fireproofing which is present. Techniques of estimation shall be explained.

(2) Written notice of intention to demolish or renovate shall be provided to the Administrator by the owner or operator of the demolition or renovation operation. Such notice shall be postmarked or delivered to the Administrator at least 10 days prior to commencement of demo-

lition, or as early as possible prior to commencement of emergency demolition subject to paragraph (d) (6) of this section, and as early as possible prior to commencement of renovation. Such notice shall include the following information:

(i) Name of owner or operator.

(ii) Address of owner or operator.

(iii) Description of the building, structure, facility, or installation to be demolished or renovated, including the size, age, and prior use of the structure, and the approximate amount of friable asbestos material used for insulation and fireproofing.

(iv) Address or location of the building, structure, facility, or installation.

(v) Scheduled starting and completion dates of demolition or renovation.

(vi) Nature of planned demolition or renovation and method(s) to be employed.

(vii) Procedures to be employed to meet the requirements of this paragraph and paragraph (j) of this section.

(viii) The name and address or location of the waste disposal site where the friable asbestos waste will be deposited.

(ix) Name, title, and authority of the State or local governmental representative who has ordered a demolition which is subject to paragraph (d) (6) of this section.

(3) (i) For purposes of determining whether a planned renovating operation constitutes a renovation within the meaning of this paragraph, the amount of friable asbestos material to be removed or stripped shall be:

(A) For planned renovating operations involving individually non-scheduled operations, the additive amount of friable asbestos material that can be predicted will be removed or stripped at a source over the maximum period of time for which a prediction can be made. The period shall be not less than 30 days and not longer than one year.

(B) For each planned renovating operation not covered by paragraph (d) (3) (i) (A), the total amount of friable asbestos material that can be predicted will be removed or stripped at a source.

(ii) For purposes of determining whether an emergency renovating operation constitutes a renovation within the meaning of this paragraph, the amount of friable asbestos material to be removed or stripped shall be the total amount of friable asbestos material that will be removed or stripped as a result of the sudden, unexpected event that necessitated the renovation.

(4) The following procedures shall be used to prevent emissions of particulate asbestos material to outside air:

(i) Friable asbestos materials, used to insulate or fireproof any pipe, duct, boiler, tank, reactor, turbine, furnace, or structural member, shall be removed from any building, structure, facility or installation subject to this paragraph. Such removal shall occur before wrecking or dismantling of any portion of such building, structure, facility, or installation that would break up the friable asbestos materials and before wrecking or dismantling of any other portion of such building, structure, facility, or installation that would preclude access to such materials for subsequent removal. Removal of friable asbestos materials used for insulation or fireproofing of any pipe, duct, or structural member which are encased in concrete or other similar structural material is not required prior to demolition, but such material shall be adequately wetted whenever exposed during demolition.

(ii) Friable asbestos materials used to insulate or fireproof pipes, ducts, boilers, tanks, reactors, turbines, furnaces, or structural members shall be adequately wetted during stripping, except as provided in paragraphs (d) (4) (iv), (d) (4) (vi) or (d) (4) (vii) of this section.

(iii) Pipes, ducts, boilers, tanks, reactors, turbines, furnaces, or structural members that are insulated or fireproofed with friable asbestos materials may be taken out of any building, structure, facility, or installation subject to this paragraph as units or in sections provided the friable asbestos materials exposed during cutting or disjointing are adequately wetted during the cutting or disjointing operation. Such units shall not be dropped or thrown to the ground, but shall be carefully lowered to ground level.

(iv) The stripping of friable asbestos materials used to insulate or fireproof any pipe, duct, boiler, tank, reactor, turbine, furnace, or structural member that has been removed as a unit or in sections as provided in paragraph (d) (4) (iii) of this section shall be performed in accordance with paragraph (d) (4) (ii) of this section. Rather than comply with the wetting requirement, a local exhaust ventilation and collection system may be used to prevent emissions to the outside air. Such local exhaust ventilation systems shall be designed and operated to capture the asbestos particulate matter produced by the stripping of friable asbestos material. There shall be no visible emissions to the outside air from such local exhaust ventilation and collection systems except as provided in paragraph (f) of this section.

(v) All friable asbestos materials that have been removed or stripped shall be adequately wetted to ensure that such materials remain wet during all remaining stages of demolition or renovation and related handling operations. Such materials shall not be dropped or thrown to the ground or a lower floor. Such materials that have been removed or stripped more than 50 feet above ground level, except those materials removed as units or in sections, shall be transported to the ground via dust-tight chutes or containers.

(vi) Except as specified below, the wetting requirements of this paragraph are suspended when the temperature at the point of wetting is below 0°C (32°F). When friable asbestos materials are not wetted due to freezing temperatures, such materials on pipes, ducts, boilers, tanks, reactors, turbines, furnaces, or structural members shall, to the maximum extent possible, be removed as units or in sections prior to wrecking. In no case shall the requirements of paragraphs (d) (4) (iv) or (d) (4) (v) be suspended due to freezing temperatures.

(vii) For renovation operations, local exhaust ventilation and collection systems may be used, instead of wetting as specified in paragraph (d) (4) (ii), to prevent emissions of particulate asbestos material to outside air when damage to equipment resulting from the wetting would be unavoidable. Upon request and supply of adequate information, the Administrator will determine whether damage to equipment resulting from wetting to comply with the provisions of this paragraph would be unavoidable. Such local exhaust ventilation systems shall be designed and operated to capture the asbestos particulate matter produced by the stripping and removal of friable asbestos material. There shall be no visible emissions to the outside air from such local exhaust ventilation and collection systems, except as provided in paragraph (f) of this section.

(5) Sources subject to this paragraph are exempt from the requirements of §§ 61.05(a), 61.07, and 61.09.

(6) The demolition of a building, structure, facility, or installation, pursuant to an order of an authorized representative of a State or local governmental agency, issued because that building is structurally unsound and in danger of imminent collapse is exempt from all but the following requirements of paragraph (d) of this section:

(i) The notification requirements specified by paragraph (d) (2) of this section;

(ii) The requirements on stripping of friable asbestos materials from previously removed units or sections as specified in paragraph (d) (4) (iv) of this section;

(iii) The wetting, as specified by paragraph (d) (4) (v) of this section, of friable asbestos materials that have been removed or stripped;

(iv) The portion of the structure being demolished that contains friable asbestos materials shall be adequately wetted during the wrecking operation.

(e) * * *

(2) Any owner or operator who intends to spray asbestos materials which contain more than 1 percent asbestos on a dry weight basis to insulate or fireproof equipment and machinery shall report such intention to the Administrator at least 20 days prior to the commencement of the spraying operation. Such report shall include the following information:

* * *

(f) Rather than meet the no-visible-emission requirements as specified by paragraphs (a), (c), (d), (e), (h), (j), and (k) of this section, an owner or operator may elect to use the methods specified by § 61.23 to clean emissions containing particulate asbestos material before such emissions escape to, or are vented to, the outside air.

(g) Where the presence of uncombined water is the sole reason for failure to meet the no-visible-emission requirement of paragraphs (a), (c), (d), (e), (h), (j), or (k) of this section, such failure shall not be a violation of such emission requirements.

(h) Fabricating: There shall be no visible emissions to the outside air, except as provided in paragraph (f) of this section, from any of the following operations if they use commercial asbestos or from any building or structure in which such operations are conducted.

(1) The fabrication of cement building products.

(2) The fabrication of friction products, except those operations that primarily install asbestos friction materials on motor vehicles.

(3) The fabrication of cement or silicate board for ventilation hoods; ovens; electrical panels; laboratory furniture; bulkheads, partitions and ceilings for marine construction; and flow control devices for the molten metal industry.

(i) Insulating: Molded insulating materials which are friable and wet-applied insulating materials which are friable after drying, installed after the effective date of these regulations, shall contain no commercial asbestos. The provisions of this paragraph do not apply to insulating materials which are spray applied; such materials are regulated under § 61.22(e).

(j) Waste disposal for manufacturing, fabricating, demolition, renovation and spraying operations: The owner or operator of any source covered under the provisions of paragraphs (c), (d), (e), or (h) of this section shall meet the following standards:

(1) There shall be no visible emissions to the outside air, except as provided in paragraph (j)(3) of this section, during the collection; processing, including incineration; packaging; transporting; or deposition of any asbestos-containing waste material which is generated by such source.

(2) All asbestos-containing waste material shall be deposited at waste disposal sites which are operated in accordance with the provisions of § 61.25.

(3) Rather than meet the requirement of paragraph (j)(1) of this section, an owner or operator may elect to use either of the disposal methods specified under (j)(3)(i) and (ii) of this section, or an alternative disposal method which has received prior approval by the Administrator:

(i) Treatment of asbestos-containing waste material with water:

(A) Control device asbestos waste shall be thoroughly mixed with water into a slurry and other asbestos-containing waste material shall be adequately wetted. There shall be no visible emissions to the outside air from the collection, mixing and wetting operations, except as provided in paragraph (f) of this section.

(B) After wetting, all asbestos-containing waste material shall be sealed into leak-tight containers while wet, and such containers shall be deposited at waste disposal sites which are operated in accordance with the provisions of § 61.25.

(C) The containers specified under paragraph (j)(3)(i)(B) of this section shall be labeled with a warning label that states:

CAUTION

Contains Asbestos
Avoid Opening or Breaking Container
Breathing Asbestos is Hazardous
to Your Health

Alternatively, warning labels specified by Occupational Safety and Health Standards of the Department of Labor, Occupational Safety and Health Administration (OSHA) under 29 CFR 1910.93a(g)(2)(ii) may be used.

(ii) Processing of asbestos-containing waste material into non-friable forms:

(A) All asbestos-containing waste material shall be formed into non-friable pellets or other shapes and deposited at waste disposal sites which are operated in accordance with the provisions of § 61.25.

(B) There shall be no visible emissions to the outside air from the collection and processing of asbestos-containing waste material, except as specified in paragraph (f) of this section.

(4) For the purposes of this paragraph (j), the term all asbestos-containing waste material as applied to demolition and renovation operations covered by paragraph (d) of this section includes only friable asbestos waste and control device asbestos waste.

(k) Waste disposal for asbestos mills: The owner or operator of any source covered under the provisions of paragraph (a) of this section shall meet the following standard:

(1) There shall be no visible emissions to the outside air, except as provided in paragraph (k)(3) of this section, during the collection, processing, packaging, transporting or deposition of any asbestos-containing waste material which is generated by such source.

(2) All asbestos-containing waste material shall be deposited at waste disposal sites which are operated in accordance with the provisions of § 61.25.

(3) Rather than meet the requirement of paragraph (k)(1) of this section, an owner or operator may elect to meet the following requirements in paragraphs (k)(3) (i) and (ii), or use an alternative disposal method which has received prior approval by the Administrator:

(i) There shall be no visible emissions to the outside air from the transfer of control device asbestos waste to the tailings conveyor, except as provided in paragraph (f) of this section. Such waste shall be subsequently processed either as specified in paragraph (k)(3)(ii) of this section or as specified in paragraph (j)(3) of this section.

(ii) All asbestos-containing waste material shall be adequately mixed, with a wetting agent recommended by the manufacturer of the agent to effectively wet dust and tailings, prior to deposition at a waste disposal site. Such agent shall be used as recommended for the particular dust by the manufacturer of the agent. There shall be no discharge of visible emissions to the outside air from the wetting operation except as specified in paragraph (f) of this section. Wetting may be suspended when the ambient temperature at the waste disposal site is less than −9.5°C (ca. 15°F). The ambient air temperature shall be determined by an appropriate measurement method with an accuracy of ±1°C (±2°F) and recorded at least at hourly intervals during the period that the operation of the wetting system is suspended. Records of such temperature measurements shall be retained at the source for a minimum of two years and made available for inspection by the Administrator.

(l) The owner of any inactive waste disposal site, which was operated by sources covered under § 61.22 (a), (c) or (h) and where asbestos-containing waste material produced by such sources was deposited, shall meet the following standards:

(1) There shall be no visible emissions to the outside air from an inactive waste disposal site subject to this paragraph, except as provided in paragraph (l)(5) of this section.

(2) Warning signs shall be displayed at all entrances, and along the property line of the site or along the perimeter of the sections of the site where asbestos-containing waste material was deposited, at intervals of 100 m (ca. 330 ft) or less, except as specified in paragraph (l)(4) of this section. Signs shall be posted in such a manner and location that a person may easily read the legend. The warning signs required by this paragraph shall conform to the requirements of 20'' x 14'' upright format signs specified in 29 CFR 1910.145(d)(4) and this paragraph. The signs shall display the following legend in the lower panel, with letter sizes and styles of a visibility at least equal to those specified in this paragraph.

LEGEND

ASBESTOS WASTE DISPOSAL SITE

Do Not Create Dust

Breathing Asbestos is Hazardous
to Your Health

Notation

1'' Sans Serif, Gothic or Block

¾'' Sans Serif, Gothic or Block

14 Point Gothic

Spacing between lines shall be at least equal to the height of the upper of the two lines.

(3) The perimeter of the site shall be fenced in a manner adequate to deter access by the general public, except as specified in paragraph (l)(4) of this section.

(4) Warning signs and fencing are not required where the requirements of paragraphs (l)(5)(i) or (ii) of this section are met, or where a natural barrier adequately deters access by the general public. Upon request and supply of appropriate information, the Administrator will determine whether a fence or a natural barrier adequately deters access to the general public.

(5) Rather than meet the requirement of paragraph (l)(1) of this section, an owner may elect to meet the requirements of this paragraph or may use an alternative control method for emissions from inactive waste disposal sites which

has received prior approval by the Administrator.

(i) The asbestos-containing waste material shall be covered with at least 15 centimeters (ca. 6 inches) of compacted non-asbestos-containing material, and a cover of vegetation shall be grown and maintained on the area adequate to prevent exposure of the asbestos-containing waste material; or

(ii) The asbestos-containing waste material shall be covered with at least 60 centimeters (ca. 2 feet) of compacted non-asbestos-containing material and maintained to prevent exposure of the asbestos-containing waste; or

(iii) For inactive waste disposal sites for asbestos tailings, a resinous or petroleum-based dust suppression agent which effectively binds dust and controls wind erosion shall be applied. Such agent shall be used as recommended for the particular asbestos tailings by the dust suppression agent manufacturer. Other equally effective dust suppression agents may be used upon prior approval by the Administrator. For purposes of this paragraph, waste crankcase oil is not considered a dust suppression agent.

7. The first sentence in § 61.23 is revised as follows:

§ 61.23 Air-Cleaning.

If air-cleaning is elected, as permitted by §§ 61.22(f) and 61.22(d)(4)(iv), the requirements of this section must be met. * * *

8. The first sentence in § 61.24 is revised and redesignated as paragraph (e) and new paragraphs (c) and (d) are added as follows:

§ 61.24 Reporting.

* * * * *

(c) For sources subject to §§ 61.22(j) and 61.22(k):

(1) A brief description of each process that generates asbestos-containing waste material.

(2) The average weight of asbestos-containing waste material disposed of, measured in kg/day.

(3) The emission control methods used in all stages of waste disposal.

(4) The type of disposal site or incineration site used for ultimate disposal, the name of the site operator, and the name and location of the disposal site.

(d) For sources subject to § 61.22(l):

(1) A brief description of the site.

(2) The method or methods used to comply with the standard, or alternative procedures to be used.

(e) Such information shall accompany the information required by § 61.10. The information described in this section shall be reported using the format of Appendix A of this part.

9. A new section 61.25 is added to subpart B as follows:

§ 61.25 Waste disposal sites.

In order to be an acceptable site for disposal of asbestos-containing waste material under § 61.22 (j) and (k), an active waste disposal site shall meet the requirements of this section.

(a) There shall be no visible emissions to the outside air from any active waste disposal site where asbestos-containing waste material has been deposited, except as provided in paragraph (e) of this section.

(b) Warning signs shall be displayed at all entrances, and along the property line of the site or along the perimeter of the sections of the site where asbestos-containing waste material is deposited, at intervals of 100 m (ca. 330 ft) or less except as specified in paragraph (d) of this section. Signs shall be posted in such a manner and location that a person may easily read the legend. The warning signs required by this paragraph shall conform to the requirements of 20" x 14" upright format signs specified in 29 CFR 1910.145(d)(4) and this paragraph. The signs shall display the following legend in the lower panel, with letter sizes and styles of a visibility at least equal to those specified in this paragraph.

LEGEND	NOTATION
ASBESTOS WASTE DISPOSAL SITE	1" Sans Serif, Gothic or Block
Do Not Create Dust	¾" Sans Serif, Gothic or Block
Breathing Asbestos is Hazardous to Your Health	14 Point Gothic

Spacing between lines shall be at least equal to the height of the upper of the two lines.

(c) The perimeter of the disposal site shall be fenced in order to adequately deter access to the general public except as specified in paragraph (d) of this section.

(d) Warning signs and fencing are not required where the requirements of paragraph (e)(1) of this section are met, or where a natural barrier adequately deters access to the general public. Upon request and supply of appropriate information, the Administrator will determine whether a fence or a natural barrier adequately deters access to the general public.

(e) Rather than meet the requirement of paragraph (a) of this section, an owner or operator may elect to meet the requirements of paragraph (e)(1) or (e)(2) of this section, or may use an alternative control method for emissions from active waste disposal sites which has received prior approval by the Administrator.

(1) At the end of each operating day, or at least once every 24-hour period while the site is in continuous operation, the asbestos-containing waste material which was deposited at the site during the operating day or previous 24-hour period shall be covered with at least 15 centimeters (ca. 6 inches) of compacted non-asbestos-containing material.

(2) At the end of each operating day, or at least once every 24-hour period while the disposal site is in continuous operation, the asbestos-containing waste material which was deposited at the site during the operating day or previous 24-hour period shall be covered with a resinous or petroleum-based dust suppression agent which effectively binds dust and controls wind erosion. Such agent shall be used as recommended for the particular dust by the dust suppression agent manufacturer. Other equally effective dust suppression agents may be used upon prior approval by the Administrator. For purposes of this paragraph, waste crankcase oil is not considered a dust suppression agent.

Subpart E—National Emission Standard for Mercury

10. Section 61.50 is revised to read as follows:

§ 61.50 Applicability.

The provisions of this subpart are applicable to those stationary sources which process mercury ore to recover mercury, use mercury chlor-alkali cells to produce chlorine gas and alkali metal hydroxide, and incinerate or dry wastewater treatment plant sludge.

11. Section 61.51 is amended by adding paragraphs (l) and (m) as follows:

§ 61.51 Definitions.

* * * * *

(l) "Sludge" means sludge produced by a treatment plant that processes municipal or industrial waste waters.

(m) "Sludge dryer" means a device used to reduce the moisture content of sludge by heating to temperatures above 65°C (ca. 150°F) directly with combustion gases.

12. Section 61.52 is revised to read as follows:

§ 61.52 Emission standard.

(a) Emissions to the atmosphere from mercury ore processing facilities and mercury cell chlor-alkali plants shall not exceed 2300 grams of mercury per 24-hour period.

(b) Emissions to the atmosphere from sludge incineration plants, sludge drying plants, or a combination of these that process wastewater treatment plant sludges shall not exceed 3200 grams of mercury per 24-hour period.

13. Section 61.53 is amended by adding paragraph (d) as follows:

§ 61.53 Stack sampling.

* * * * *

(d) Sludge incineration and drying plants.

(1) Unless a waiver of emission testing is obtained under § 61.13, each owner or operator of a source subject to the standard in § 61.52(b) shall test emissions from that source. Such tests shall be conducted in accordance with the procedures set forth either in paragraph (d) of this section or in § 61.54.

(2) Method 101 in Appendix B to this part shall be used to test emissions as follows:

(i) The test shall be performed within 90 days of the effective date of these regulations in the case of an existing source or a new source which has an initial startup date preceding the effective date.

(ii) The test shall be performed within 90 days of startup in the case of a new source which did not have an initial startup date preceding the effective date.

(3) The Administrator shall be notified at least 30 days prior to an emission test, so that he may at his option observe the test.

(4) Samples shall be taken over such a period or periods as are necessary to determine accurately the maximum emissions which will occur in a 24-hour period. No changes shall be made in the operation which would potentially increase emissions above the level determined by the most recent stack test, until the new emission level has been estimated by calculation and the results reported to the Administrator.

(5) All samples shall be analyzed, and mercury emissions shall be determined within 30 days after the stack test. Each determination shall be reported to the Administrator by a registered letter dispatched before the close of the next business day following such determination.

(6) Records of emission test results and other data needed to determine total emissions shall be retained at the source and shall be made available, for inspection by the Administrator, for a minimum of 2 years.

14. Sections 61.54 and 61.55 are added as follows:

§ 61.54 Sludge sampling.

(a) As an alternative means for demonstrating compliance with § 61.52 (b), an owner or operator may use Method 105 of Appendix B and the procedures specified in this section.

(1) A sludge test shall be conducted within 90 days of the effective date of these regulations in the case of an existing source or a new source which has an initial startup date preceding the effective date; or

(2) A sludge test shall be conducted within 90 days of startup in the case of a new source which did not have an initial startup date preceding the effective date.

(b) The Administrator shall be notified at least 30 days prior to a sludge sampling test, so that he may at his option observe the test.

(c) Sludge shall be sampled according to paragraph (c)(1) of this section, sludge charging rate for the plant shall be determined according to paragraph (c)(2) of this section, and the sludge analysis shall be performed according to paragraph (c)(3) of this section.

(1) The sludge shall be sampled after dewatering and before incineration or drying, at a location that provides a representative sample of the sludge that is charged to the incinerator or dryer. Eight consecutive grab samples shall be obtained at intervals of between 45 and 60 minutes and thoroughly mixed into one sample. Each of the eight grab samples shall have a volume of at least 200 ml but not more than 400 ml. A total of three composite samples shall be obtained within an operating period of 24 hours. When the 24-hour operating period is not continuous, the total sampling period shall not exceed 72 hours after the first grab sample is obtained. Samples shall not be exposed to any condition that may result in mercury contamination or loss.

(2) The maximum 24-hour period sludge incineration or drying rate shall be determined by use of a flow rate measurement device that can measure the mass rate of sludge charged to the incinerator or dryer with an accuracy of ±5 percent over its operating range. Other methods of measuring sludge mass charging rates may be used if they have received prior approval by the Administrator.

(3) The handling, preparation, and analysis of sludge samples shall be accomplished according to Method 105 in Appendix B of this part.

(d) The mercury emissions shall be determined by use of the following equation:

$$E_{Hg} = 1 \times 10^{-3} cQ$$

where

E_{Hg} = Mercury emissions, g/day.
c = Mercury concentration of sludge on a dry solids basis, µg/g (ppm).
Q = Sludge charging rate, kg/day.

(e) No changes in the operation of a plant shall be made after a sludge test has been conducted which would potentially increase emissions above the level determined by the most recent sludge test, until the new emission level has been estimated by calculation and the results reported to the Administrator.

(f) All sludge samples shall be analyzed for mercury content within 30 days after the sludge sample is collected. Each determination shall be reported to the Administrator by a registered letter dispatched before the close of the next business day following such determination.

(g) Records of sludge sampling, charging rate determination and other data needed to determine mercury content of wastewater treatment plant sludges shall be retained at the source and made available, for inspection by the Administrator, for a minimum of 2 years.

§ 61.55 Emission monitoring.

(a) Wastewater treatment plant sludge incineration and drying plants. All such sources for which mercury emissions exceed 1600 g/day, demonstrated either by stack sampling according to § 61.53 or sludge sampling according to § 61.54, shall monitor mercury emissions at intervals of at least once per year by use of Method 105 of Appendix B, or the procedures specified in § 61.54(c) and (d). The results of monitoring shall be reported and retained according to § 61.53(d) (5) and (6), or § 61.54(f) and (g).

15. Appendix A is revised to a new reporting format, and sections (I)(C) and (I)(D) are added as follows:

APPENDIX A

National Emission Standards for Hazardous Air Pollutants

Compliance Status Information

I. SOURCE REPORT

INSTRUCTIONS: Owners or operators of sources of hazardous pollutants subject to the National Emission Standards for Hazardous Air Pollutants are required to submit the information contained in Section I to the appropriate U.S. Environmental Protection Agency Regional Office prior to 90 days after the effective date of any standards or amendments which require the submission of such information.

A list of regional offices is provided in §61.04. ____________________

A. SOURCE INFORMATION

1. Identification/Location - Indicate the name and address of each source.

1 2 Region 3 4 State 5 8 County 9 13 Source Number 14 0 0 0 16 17 0 0 18 1 19
20 22 AQCR # 23 26 City Code 27 Source Name 46
47 Street Address (Location of Plant) 66 80
Dup 1-18 19 20 City Name 34 State 35 39
40 State Regis. Number 54 55 58 NEDS X Ref.
59 SIC 62 PF 64 8 N/P 65 77 Staff 79 80
Dup 1-18 5 19 CS 30 DTP 31 EC 49 80

2. Contact - Indicate the name and telephone number of the owner or operator or other responsible official whom EPA may contact concerning this report.

Dup 1-18   4 1   19 ‾ 20   21 ‾‾‾‾ Name ‾‾‾‾ 43

44 ‾ 46 Area Code   47 ‾ Number ‾ 54   80

3. Source Description - Briefly state the nature of the source (e.g., "Chlor-alkali Plant" or "Machine Shop").

Dup 1-18   4 2   19 ‾ 20   21 ‾‾‾‾ Description ‾‾‾‾ 80

81 ‾‾‾‾ Continued ‾‾‾‾ 79   80

4. Alternative Mailing Address - Indicate an alternative mailing address if correspondence is to be directed to a location different than that specified above.

Dup 1-18   4 3   19 ‾ 20   21 ‾ Number Street or Box Number ‾ 45   80

Dup 1-18   4 4   19 ‾ 20   21 ‾‾‾ City ‾‾‾ 35   37 ‾ 38 State   41 ‾ Zip ‾ 44   80

5. Compliance Status - The emissions from this source ___ can ___ cannot meet the emission limitations contained in the National Emission Standards on or prior to 90 days after the effective date of any standards or amendments which require the submission of such information.

____
Signature of Owner, Operator or Other Responsible Official

NOTE: If the emissions from the source will exceed those limits set by the National Emission Standards for Hazardous Air Pollutants, the source will be in violation and subject to Federal enforcement actions unless granted a waiver of compliance by the Administrator of the U.S. Environmental Protection Agency. The information needed for such waivers is listed in Section II of this form.

B. PROCESS INFORMATION. Part B should be completed separately for each point of emission for each hazardous pollutant. [Sources subject to 61.22(1) may omit number 4. below.]

Dup 1-13   14 ‾ 16   0 0   17 ‾ 18   5   19   20 ‾‾‾ SCC ‾‾‾ 27   28 ‾ 29 NEDS X Ref   30 LS   31 SIP

1. Pollutant Emitted - Indicate the type of hazardous pollutant emitted by the process. Indicate "AB" for asbestos, "BE" for beryllium, or "HG" for mercury.

32 33 Pollutant
34 Regulation 48
49 EC

2. Process Description - Provide a brief description of each process (e.g., "hydrogen end box" in a mercury chlor-alkali plant, "grinding machine" in a beryllium machine shop). Use additional sheets if necessary.

50 Process Description 74
80

Dup 1-18
6 1
19 20
21 50
51 79
80

Dup 1-18
6 2
19 20
21 50
51 79
80

3. Amount of Pollutant - Indicate the average weight of the hazardous material named in Item 1 which enters the process in pounds per month (based on the previous twelve months of operation).

Dup 1-18
6 3
19 20
21 27
lbs./mo.
29 36
80

4. Control Devices

Indicate the type of pollution control devices, if any, used to reduce the emissions from the process (e.g., venturi scrubber, baghouse, wet cyclone) and the estimated percent of the pollutant which the device removes from the process gas stream.

Dup 1-18
6 4
19 20
PRIMARY CONTROL DEVICE:
21 43

45 Primary Device Name 64
66 70 Percent Removal Efficiency
72 79

80

Dup 1-18 6 5 SECONDARY CONTROL DEVICES:
19 20 21 45

47 Secondary Device Name 64 66 70 Percent Removal Efficiency

% EFFIC.
72 79 80

b. Asbestos Emission Control Devices Only

i. If a baghouse is specified in Item 4a, give the following information: —

- The air flow permeability in cubic feet per minute per square foot of fabric area.

Air flow permeability = __________ cfm/ft^2

- The pressure drop in inches water gauge across the filter at which the baghouse is operated.

Operating pressure drop = __________ inches w.g.

- If the baghouse material contains synthetic fill yarn, check whether this material is / / spun / / or not spun.

- If the baghouse utilizes a felted fabric, give the minimum thickness in inches and the density in ounces per square yard.

Thickness = ________ inches Density = ________ oz/yd^2

ii. If a wet collection device is specified in Item 4a, give the designed unit contacting energy in inches water gauge.

- Unit contacting energy = _________ inches w.g.

C. DISPOSAL OF ASBESTOS-CONTAINING WASTES. Part C should be completed separately for each asbestos-containing waste generation operation arising from sources subject to §61.22(a), (c), (e), and (h).

Dup 1-13 14 16 0 0
17 18 5
19 20 SCC 27 28 29 NEDS X Ref 30 CS 31 SIP

A B
32 33 Pollutant 34 Regulation 48 49 EC

1. Waste Generation - Provide a brief description of each process that generates asbestos-containing waste (e.g. disposal of control device wastes).

50 ________ Process Description ________ 79 80

2. Asbestos Concentration - Indicate the average percentage asbestos content of these materials.

Dup 1-18 6 1 (19 20) 21 ________ ASBESTOS CONCENTRATION: ________ 43 45 ________ 48

% (50) 80

3. Amount of Wastes - Indicate the average weight of asbestos-containing wastes disposed of, measured in kg/day.

Dup 1-18 6 2 (19 20) 21 ________ 27 29 ________ kg/day ________ 34 80

4. Control Methods - Indicate the emission control methods used in all stages of waste disposal, from collection, processing, and packaging to transporting and deposition.

Dup 1-18 6 3 (19 20) 21 ________ Primary Control Method ________ 43

45 ________________ 79 80

Dup 1-18 6 4 (19 20) 21 ________________ 50

51 ________________ 79 80

5. Waste Disposal - Indicate the type of disposal site (sanitary landfill, open, covered) or incineration site (municipal, private) where the waste is disposed of and who operates the site (company, private, municipal). State the name and location of the site (closest city or town, county, state).

Dup 1-18 6 5 (19 20) 21 ________ TYPE OF SITE: ________ 33 35 ________ 50

51 ________________ 79 80

Dup 1-18   6 6 (19–20)   OPERATOR: 21 ________ 29   31 ________ 60

61 ________ 79   80

Dup 1-18   6 7 (19–20)   LOCATION: 21 ________ 29

31 ________ 70

71 ________ 79   80

D. WASTE DISPOSAL SITES. Part D should be completed separately for each asbestos waste disposal site subject to section 61.22(l).

Dup 1-13   14 ____ 16   0 0 (17–18)   5 (19)   20 ____ SCC ____ 27   28 ____ 29 MEDS X Ref   30 CS   31 SIP

A B (32–33) Pollutant   34 ____ Regulation ____ 48   49 EC

WASTE DISPOSAL SITE 50 ________ 68   80

1. Description - Provide a brief description of the site, including its size and configuration, and the distance to the closest city or town, closest residence, and closest primary road.

Dup 1-18   6 1 (19–20)   SITE DESCRIPTION 21 ________ 37   39 ________ 50

51 ________ 79   80

Dup 1-18   6 2 (19–20)   DISTANCE: 21 ____ 29   TOWN: 30 ____ 34   36 ____ 40   K M (42–43)

RESIDENCE: 45 ________ 54   56 ____ 60   K M (62–63)   ROAD: 65 ____ 69   71 ____ 76

K M (77–78)   80

2. Inactivation - After the site is inactivated, indicate the method or methods used to comply with the standard and send a list of the actions that will be undertaken to maintain the inactivated site.

Dup 1-18 6 8 COMPLIANCE METHOD/INACTIVE SITE:
19 20 21 ____ 52

54 ____ 79 80

II. WAIVER REQUESTS

A. WAIVER OF COMPLIANCE. Owners or operators of sources unable to operate in compliance with the National Emission Standards for Hazardous Air Pollutants prior to 90 days after the effective date of any standards or amendments which require the submission of such information may request a waiver of compliance from the Administrator of the U.S. Environmental Protection Agency for the time period necessary to install appropriate control devices or make modifications to achieve compliance. The Administrator may grant a waiver of compliance with the standard for a period not exceeding two years from the effective date of the hazardous pollutant standards, if he finds that such period is necessary for the installation of controls and that steps will be taken during the period of the waiver to assure that the health of persons will be protected from imminent endangerment.

The report information provided in Section I must accompany this application. Applications should be sent to the appropriate EPA regional office.

1. Processes Involved - Indicate the process or processes emitting hazardous pollutants to which emission controls are to be applied.

2. Controls

   a. Describe the proposed type of control device to be added or modification to be made to the process to reduce the emissions of hazardous pollutants to an acceptable level. (Use additional sheets if necessary.)

   b. Describe the measures that will be taken during the waiver period to assure that the health of persons will be protected from imminent endangerment. (Use additional sheets if necessary.)

3. Increments of Progress - Specify the dates by which the following increments of progress will be met.

   - Date by which contracts for emission control systems or process modifications will be awarded; or date by which orders will be issued for the purchase of the component parts to accomplish emission control or process modification.

Dup 1-16 0 1 7
17 19 53 54 55 60 61 MO/DY/YR 66 80

- Date of initiation of on-site construction or installation of emission control equipment or process change.

Dup 1-16 0 2 7
17 19 53 54 55 60 61 MO/DY/YR 66 80

- Date by which on-site construction or installation of emission control equipment or process modification is to be completed.

Dup 1-16 0 3 7
17 19 53 54 55 60 61 MO/DY/YR 66 80

- Date by which final compliance is to be achieved.

Dup 1-16 0 4 7
17 19 53 54 55 60 61 MO/DY/YR 66 80

B. WAIVER OF EMISSION TESTS. A waiver of emission testing may be granted to owners or operators of sources of beryllium or mercury pollutants if, in the judgment of the Administrator of the Environmental Protection Agency the emissions from the source comply with the appropriate standard or if the owners or operators of the source have requested a waiver of compliance or have been granted a waiver of compliance.

This application should accompany the report information provided in Section I.

1. Reason - State the reasons for requesting a waiver of emission testing. If the reason stated is that the emissions from the source are within the prescribed limits, documentation of this condition must be attached.

Date

Signature of the owner or operator

APPENDIX B—TEST METHODS

16. Method 105 is added to Appendix B as follows:

* * * * *

METHOD 105. METHOD FOR DETERMINATION OF MERCURY IN WASTEWATER TREATMENT PLANT SEWAGE SLUDGES

1. *Principle and applicability.* 1.1 Principle—A weighed portion of the sewage sludge sample is digested in aqua regia for 2 minutes at 95°C, followed by oxidation with potassium permanganate. Mercury in the digested sample is then measured by the conventional spectrophotometer cold vapor technique. An alternative digestion involving the use of an autoclave is described in paragraph 4.5.2 of this method.

1.2 Applicability—This method is applicable for the determination of total organic and inorganic mercury content in sewage sludges, soils, sediments, and bottom-type materials. The normal range of this method is 0.2 to 5 µg/g. The range may be extended above or below the normal range by increasing or decreasing sample size and through instrument and recorder control.

2. *Apparatus.* 2.1 Analysis—The conventional cold vapor technique(5) is used to analyze the sample.

2.1.1 Atomic Absorption Spectrophotometer[1]—Any atomic absorption unit having an open sample presentation area in which to mount the absorption cell is suitable. Instrument settings recommended by the particular manufacturer should be followed.

2.1.2 Mercury Hollow Cathode Lamp—Westinghouse WL-22847, argon filled, or equivalent.

2.1.3 Recorder—Any multirange, variable-speed recorder that is compatible with the UV detection system is suitable.

2.1.4 Absorption Cell—Standard spectrophotometer cells 10 cm long, having quartz end windows may be used. Suitable cells may be constructed from plexiglass tubing, 2.5 cm O.D. x 11.4 cm (ca. 1'' O.D. x 4½''). The ends are ground perpendicular to the longitudinal axis, and quartz windows [2.5 cm diameter x 0.16 cm thickness (ca. 1'' diameter x 1/16'' thickness)] are cemented in place. Gas inlet and outlet ports [also of plexiglass but 0.6 cm O.D. (ca. ¼'' O.D.)] are attached approximately 1.3 cm (½'') from each end. The cell is strapped to a burner for support and aligned in the light beam to give the maximum transmittance. NOTE: Two 5.1 cm x 5.1 cm (ca. 2'' x 2'') cards with 2.5 cm (ca. 1'') diameter holes may be placed over each end of the cell to assist in positioning the cell for maximum transmittance.

2.1.5 Air Pump—Any peristaltic pump capable of delivering 1 liter of air per minute may be used. A Masterflex pump with electronic speed control has been found to be satisfactory. (Regulated compressed air can be used in an open one-pass system.)

2.1.6 Flowmeter—Capable of measuring an air flow of 1 liter per minute.

2.1.7 Aeration Tubing—Tygon tubing is used for passage of the mercury vapor from the sample bottle to the absorption cell and return. Straight glass tubing terminating in a coarse porous frit is used for sparging air into the sample.

2.1.8 Drying Tube—15 cm long x 1.9 cm diameter (ca. 6'' long x ¾'' diameter) tube containing 20 grams of the desiccant magnesium perchlorate. The apparatus is assembled as shown in Figure 105-1. In place of the magnesium perchlorate drying tube, a small reading lamp with 60W bulb may be used to prevent condensation of moisture inside the cell. The lamp is positioned so as not to interfere with the measurement and to shine on the absorption cell maintaining the air temperature about 5°C above ambient.

3. *Reagents.* 3.1 Analysis.

3.1.1 Aqua Regia—Prepare immediately before use by carefully adding three volumes of concentrated HCl to one volume of concentrated HNO_3.

3.1.2 Sulfuric Acid, 0.5N—Dilute 14.0 ml of concentrated sulfuric acid to 1.0 liter.

3.1.3 Stannous Sulfate—Add 25 g stannous sulfate to 250 ml of 0.5N sulfuric acid. This mixture is a suspension and should be stirred continuously during use. Stannous chloride may be used in place of the stannous sulfate.

3.1.4 Sodium Chloride—Hydroxylamine Sulfate Solution—Dissolve 12 grams of sodium chloride and 12 grams of hydroxylamine sulfate in distilled water and dilute to 100 ml. Hydroxylamine hydrochloride may be used in place of the hydroxylamine sulfate.

3.1.5 Potassium Permanganate—5% solution, w/v. Dissolve 5 grams of potassium permanganate in 100 ml of distilled water.

3.1.6 Stock Mercury Solution—Dissolve 0.1354 grams of reagent grade mercuric chloride (Assay >95%) in 75 ml of distilled water. Add 10 ml of concentrated nitric acid and adjust the volume to 100.0 ml. 1 ml = 1 mg Hg.

3.1.7 Working Mercury Solution—Make successive dilutions of the stock mercury solution to obtain a working standard containing 0.1 µg per ml. This working standard and the dilutions of the stock mercury solution should be prepared fresh daily. Acidity of the working standard should be maintained at 0.15% nitric acid. This acid should be added to the flask as needed before the addition of the aliquot. Mercuric solutions should not be prepared in plastic containers.

4. *Procedures.* Samples for mercury analysis are subject to contamination from a variety of sources. Extreme care must be taken to prevent contamination. Certain interferences may occur during the analysis procedures. Extreme caution must be taken to avoid inhalation of mercury.

4.1 Sample Handling and Preservation.

4.1.1 Because of the extreme sensitivity of the analytical procedure and the omnipresence of mercury, care must be taken to avoid extraneous contamination. Sampling devices, sample containers, and reagents should be ascertained to be free of significant amounts of mercury; the sample should not be exposed to any condition in the laboratory that may result in contact or airborne mercury contamination. Sample containers to be used for collection and shipment of mercury samples should be properly cleaned before use. These should be rinsed with at least 20% v/v HNO_3 followed by distilled water.

4.1.2 While the sample may be analyzed without drying, it has been found to be more convenient to analyze a dry sample. Moisture may be driven off in a drying oven at a temperature of 60°C. No significant mercury losses have been observed by using this drying step. The dry sample should be pulverized and thoroughly mixed before the aliquot is weighed.

4.2 Interferences.

4.2.1 Interferences that may occur in sludge samples are sulfides, high copper, high chlorides, etc. A discussion of possible interferences and suggested preventative measures to be taken is given in Reference (6) (7).

4.2.2 Volatile materials which absorb at the 253.7 nm will cause a positive interference. In order to remove any interfering volatile materials, the dead air space in the BOD bottle should be purged with nitrogen before the addition of stannous sulfate.

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[1] Instruments designed specifically for the measurement of mercury using the cold vapor technique are commercially available and may be substituted for the atomic absorption spectrophotometer.

4.3 Handling Sample Mercury Vapors After Analysis.

4.3.1 Because of the toxic nature of mercury vapor, precaution must be taken to avoid its inhalation. Therefore, a bypass should be included in the analysis system to either vent the mercury vapor into an exhaust hood or pass the vapor through some absorbing media, such as:

(a) equal volumes of 0.1N $KMNO_4$ and 10% H_2SO_4;

(b) 0.25% iodine in a 3% KI solution.

A specially treated charcoal that will absorb mercury vapor is also available from Barnebey and Cheney, E. 8th Ave. and North Cassidy St., Columbus, Ohio 43219, Catalog No. 580-13 or No. 580-22.[5]

4.4 Calibration.

4.4.1 Transfer 0, 0.5, 1.0, 2.0, 5.0 and 10 ml aliquots of the working mercury solution containing 0 to 1.0 µg of mercury to a series of 300-ml BOD bottles. Add enough distilled water to each bottle to make a total volume of 10 ml. Add 5 ml of aqua regia and heat 2 minutes in a water bath at 95°C. Allow the sample to cool and add 50 ml distilled water and 15 ml of $KMnO_4$ solution to each bottle and return to the water bath for 30 minutes. Cool and add 6 ml of sodium chloride-hydroxylamine sulfate solution to reduce the excess permanganate. Add 50 ml of distilled water. Treating each bottle individually, add 5 ml of stannous sulfate solution and immediately attach the bottle to the aeration apparatus. At this point, the sample is allowed to stand quitely without manual agitation. The circulating pump, which has previously been adjusted to a rate of 1 liter per minute, is allowed to run continuously. The absorbance, as exhibited either on the spectrophotometer or the recorder, will increase and reach maximum within 30 seconds. As soon as the recorder pen levels off, approximately 1 minute, open the bypass valve and continue the aeration until the absorbance returns to its minimum value. Close the bypass valve, remove the fritted tubing from the BOD bottle and continue the aeration. Proceed with the standards and construct a standard curve by plotting peak height versus micrograms of mercury.

4.5 Analysis.

4.5.1 Weigh triplicate 0.2g ± 0.001 g portions of dry sample and place in bottom of a BOD bottle. Add 5 ml of distilled water and 5 ml of aqua regia. Heat 2 minutes in a water bath at 95°C. Cool and add 50 ml distilled water and 15 ml potassium permanganate solution to each sample bottle. Mix thoroughly and place in the water bath for 30 minutes at 95°C. Cool and add 6 ml of sodium chloride-hydroxylamine sulfate to reduce the excess permanganate. Add 55 ml of distilled water. Treating each bottle individually, add 5 ml of stannous sulfate and immediately attach the bottle to the aeration apparatus. With each sample, continue as described in paragraph 4.4.1 of this method.

4.5.2 An alternative digestion procedure using an autoclave may also be used. In this method 5 ml of concentrated H_2SO_4 and 2 ml of concentrated HNO_3 are added to the 0.2 grams of sample. 5 ml of saturated $KMnO_4$ solution are added and the bottle is covered with a piece of aluminum foil. The samples are autoclaved at 121°C and 1.1 kg/cm² (ca. 15 psig) for 15 minutes. Cool, make up to a volume of 100 ml with distilled water, and add 6 ml of sodium chloride-hydroxylamine sulfate solution to reduce the excess permanganate. Purge the dead air space and continue as described in paragraph 4.4.1 of this method.

5. *Calculation.* 5.1 Measure the peak height of the unknown from the chart and read the mercury value from the standard curve.

5.2 Calculate the mercury concentration in the sample by the formula:

$$\mu g\ Hg/gm = \frac{\mu g\ Hg \text{ in the aliquot}}{\text{wt. of the aliquot in g}}$$

5.3 Report mercury concentrations as follows: Below 0.1 µg/g; between 0.1 and 1 µg/g, to the nearest 0.01 µg/g; between 1 and 10 µg/g, to nearest 0.1 µg; above 10 µg/g, to nearest µg.

6. *Precision and accuracy.* 6.1 According to the provisional method in reference number 5, the following standard deviations on replicate sediment samples have been recorded at the indicated levels: 0.29 µg/g ± 0.02, and 0.82 µg/g ± 0.03. Recovery of mercury at these levels, added as methyl mercuric chloride, was 97 and 94%, respectively.

7. *References.*

1. Bishop, J. N. "Mercury in Sediments," Ontario Water Resources Comm., Toronto, Ontario, Canada, 1971.

2. Salma, M. Private communication, EPA Cal/Nev Basin Office, Alameda, California.

3. Hatch, W. R., and Ott, W. L. "Determination of Sub-Microgram Quantities of Mercury by Atomic Absorption Spectrophotometry," Ana. Chem. 40, 2085 (1968).

4. Bradenberger, H. and Bader, H. "The Determination of Nanogram Levels of Mercury in Solution by a Flameless Atomic Absorption Technique," Atomic Absorption Newsletter 6, 101 (1967).

5. Analytical Quality Control Laboratory (AQCL), Environmental Protection Agency, Cincinnati, Ohio, "Mercury in Sediment (Cold Vapor Technique)," Provisional Method, April 1972.

6. Kopp, J. F., Longbottom, M. C. and Lobring, L. B. "Cold Vapor Method for Determining Mercury," Journal AWWA, 64, 1 (1972), pp. 20–25.

7. "Manual of Methods for Chemical Analysis of Water and Wastes," Environmental Protection Agency, EPA-625/6-74-003, pp. 118–138.

[FR Doc.75-27231 Filed 10-14-75;8:45 am]

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[5] Mention of trade names or specific products does not constitute endorsement by the Environmental Protection Agency.

8

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Delegation of Authority to State of New York

Pursuant to the delegation of authority for national emission standards for hazardous air pollutants (NESHAPS) to the State of New York on August 6, 1975, EPA is today amending 40 CFR 61.04, Address, to reflect this delegation. A Notice announcing this delegation is published elsewhere in today's FEDERAL REGISTER. The amended § 61.04, which adds the address of the New York Department of Environmental Conservation, to which all reports, requests, applications, submittals, and communications to the Administrator pursuant to this part must also be addressed, is set forth below.

The Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegation which is reflected by this administrative amendment was effective on August 6, 1975, and it serves no purpose to delay the technical change of this addition of the State address to the Code of Federal Regulations.

This rulemaking is effective immediately, and is issued under the authority of Section 112 of the Clean Air Act, as amended.

42 U.S.C. 1857c-7

Dated: October 4, 1975.

STANLEY W. LEGRO,
Assistant Administrator
for Enforcement.

Part 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

1. In 61.04 paragraph (b) is amended by revising subparagraph (HH) to read as follows:

§ 61.04 Address.

* * * * *

(b) * * *

(HH)—New York: New York State Department of Environmental Conservation, 50 Wolf Road, Albany, New York 12233, attention: Division of Air Resources.

* * * * *

[FR Doc.75-27581 Filed 10-14-75;8:45 am]

9

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Delegation of Authority to State of Colorado

Pursuant to the delegation of authority for national emission standards for hazardous air pollutants (NESHAPS) to the State of Colorado on August 27, 1975, EPA is today amending 40 CFR 61.04, Address, to reflect this delegation. A Notice announcing this delegation is published today in the Federal Register. The amended § 61.04, which adds the address of the Colorado Air Pollution Control Division to which all reports, requests, applications, submittals, and communications to the Administrator pursuant to this part must also be addressed, is set forth below.

The Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegation which is reflected by this administrative amendment was effective on August 27, 1975, and it serves no purpose to delay the technical change of this addition of the State address to the Code of Federal Regulations.

This rulemaking is effective immediately, and is issued under the authority of Section 112 of the Clean Air Act, as amended, 42 U.S.C. 1857c-7.

Dated: October 22, 1975.

STANLEY W. LEGRO,
Assistant Administrator
for Enforcement.

Part 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

1. In § 61.04 paragraph (b) is amended by revising subparagraph (G) to read as follows:

§ 61.04 Address.

* * * * *

(b) * * *

(G)—State of Colorado, Colorado Air Pollution Control Division, 4210 East 11th Avenue, Denver, Colorado 80220.

* * * * *

[FR Doc.75-29237 Filed 10-30-75;8:45 am]

10

[FRL 470-4]

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Delegation of Authority to Washington Local Agencies

Pursuant to section 112(d) of the Clean Air Act, as amended, the Regional Administrator of Region X, Environmental Protection Agency (EPA), delegated to the State of Washington Department of Ecology on February 28, 1975, the authority to implement and enforce the program for national emission standards for hazardous air pollutants (NESHAPS). The delegation was announced in the FEDERAL REGISTER on April 1, 1975 (40 FR 14632). On April 25, 1975 (40 FR 18169) the Assistant Administrator for Air and Waste Management promulgated a change to 40 CFR 61.04, *Address*, to reflect the delegation to the State of Washington.

On September 22 and 23, 1975, the State Department of Ecology requested EPA's concurrence in the State's subdelegation of the NESHAPS program to four local air pollution control agencies. After reviewing the State's request, the Regional Administrator determined that the sub-delegations meet all the requirements outlined in EPA's delegation of February 28, 1975. Therefore, the Regional Administrator on October 15, 1975, concurred in the sub-delegations to the four local agencies listed below with the stipulation that all the conditions placed on the original delegation to the State shall also apply to the sub-delegations to the local agencies. EPA is today amending 40 CFR 61.04 to reflect the State's sub-delegations.

The amended § 61.04 provides that all reports, requests, applications, submittals and communications required pursuant to Part 61 which were previously to be sent to the Director of the State of Washington Department of Ecology (DOE) will now be sent to the Puget Sound Air Pollution Control Agency (PSAPCA), the Northwest Air Pollution Authority (NWAPA), the Spokane County Air Pollution Authority (SCAPA) or the Yakima County Clean Air Authority (YCCAA), as appropriate. It should be noted that the delegation to the YCCAA applies only to demolition projects containing asbestos. Other source categories located in Yakima County subject to the NESHAPS regulation should continue to address all correspondence to the Department of Ecology. The amended section is set forth below.

The Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegations which are reflected by this administrative amendment were effective on September 22 to the YCCAA and September 23 to the other three agencies, and it serves no useful purpose to delay the technical change of the addition of the local agency addresses to the Code of Federal Regulations.

This rulemaking is effective immediately, and is issued under the authority of section 112 of the Clean Air Act, as amended. 42 U.S.C. 1857c-7.

Dated: December 16, 1975.

STANLEY W. LEGRO,
Assistant Administrator for Enforcement.

Part 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

1. In § 61.04, paragraph (b)(WW) is revised to read as follows:

§ 61.04 Address.

* * * * *

(b) * * *

(WW)(i) Washington; State of Washington, Department of Ecology, Olympia, Washington 98504.

(ii) Northwest Air Pollution Authority, 207 Pioneer Building, Second and Pine Streets, Mount Vernon, Washington 98273.

(iii) Puget Sound Air Pollution Control Agency, 410 West Harrison Street, Seattle, Washington 98119.

(iv) Spokane County Air Pollution Control Authority, North 811 Jefferson, Spokane, Washington 99201.

(v) Yakima County Clean Air Authority, County Courthouse, Yakima, Washington 98901.

* * * * *

[FR Doc 75-34161 Filed 12-17-75;8:45 am]

FEDERAL REGISTER, VOL. 40, NO. 244—THURSDAY, DECEMBER 18, 1975

11

[FRL 474-2]

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Delegation of Authority to State of Maine

Pursuant to the delegation of authority for National Emission Standards for Hazardous Air Pollutants (NESHAPS) to the State of Maine on November 3, 1975, EPA is today amending 40 CFR 61.04, *Address*, to reflect this delegation. A Notice announcing this delegation is published today in the FEDERAL REGISTER.[1] The amended § 61.04, which adds the address of the Maine Department of Environmental Protection to which all reports, requests, applications, submittals, and communications to the Administrator pursuant to this part must also be addressed, is set forth below.

The Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegation which is reflected by this administrative amendment was effective on October 7, 1975, and it serves no purpose to delay the technical change of this addition of the State address to the Code of Federal Regulations.

This rulemaking is effective immediately, and is issued under the authority of Section 112 of the Clean Air Act, as amended.

(42 U.S.C. 1857c-7)

Dated: December 22, 1975.

STANLEY W. LEGRO,
Assistant Administrator for Enforcement.

Part 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

In § 61.04 paragraph (b) is amended by revising subparagraph (U) to read as follows:

§ 61.04 - Address.

* * * * *

(b) * * *

(U) State of Maine, Department of Environmental Protection, State House, Augusta, Maine 04330.

* * * * *

[FR Doc.75-35064 Filed 12-29-75;8:45 am]

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[1] See FR Doc. 75-35063 appearing elsewhere in the Notices section of today's FEDERAL REGISTER.

FEDERAL REGISTER, VOL. 40, NO. 250—TUESDAY, DECEMBER 30, 1975

12

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Delegation of Authority to the State of Michigan

Pursuant to the delegation of authority for national emission standards for hazardous air pollutant (NESHAPS) to the State of Michigan on November 5, 1975, EPA is today amending 40 CFR 61.04, Address, to reflect this delegation.[1] The amended Section 61.04, which adds the address of the Air Pollution Control Division, Michigan Department of Natural Resources to that list of addresses to which all reports, requests, applications, submittals, and communications to the Administrator pursuant to this part must be sent, is set forth below.

The Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegation which is reflected by this administrative amendment was effective on November 5, 1975, and it serves no purpose to delay the technical change of this addition of the State address to the Code of Federal Regulations.

This rulemaking is effective immediately, and is issued under the authority of section 112 of the Clean Air Act, as amended. 42 U.S.C. 1857c-7.

Dated: December 31, 1975.

STANLEY W. LEGRO,
Assistant Administrator for Enforcement.

Part 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

1. In § 61.04, paragraph (b) is amended by revising subparagraph X, to read as follows:

61.04 Address.

* * * * *

(b) * * *

(A)-(W) * * *

(X) State of Michigan, Air Pollution Control Division, Michigan Department of Natural Resources, Stevens T. Mason Building, 8th Floor, Lansing, Michigan 48926.

* * * * *

[FR Doc.76-848 Filed 1-12-76;8:45 am]

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[1] A Notice announcing this delegation is published in the Notices section of this issue.

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PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Delegation of Authority to Washington Local Agencies

Pursuant to section 112(d) of the Clean Air Act, as amended, the Regional Administrator of Region X, Environmental Protection Agency (EPA), delegated to the State of Washington Department of Ecology on February 28, 1975, the authority to implement and enforce the program for national emission standards for hazardous air pollutants (NESHAPS). The delegation was announced in the FEDERAL REGISTER on April 1, 1975 (40 FR 14632). On April 25, 1975 (40 FR 18169) the Assistant Administrator for Air and Waste Management promulgated a change to 40 CFR 61.04, *Address*, to reflect the delegation to the State of Washington.

On October 23, 1975, the State Department of Ecology requested EPA's concurrence in the State's sub-delegation of the NESHAPS program to two local air pollution control agencies. Previously, EPA concurred in the State's sub-delegation to four local agencies. See 40 FR 58646, December 18, 1975. After reviewing the State's October 23 request the Regional Administrator determined that the sub-delegations met all the requirements outlined in EPA's delegation of February 28, 1975. Therefore, the Regional Administrator on December 5, 1975, concurred in the sub-delegations to the two local agencies listed below with the stipulation that all the conditions placed on the original delegation to the State shall also apply to the sub-delegations to the local agencies. EPA is today amending 40 CFR 61.04 to reflect the State's sub-delegations.

The amended § 61.04 provides that all reports, requests, applications, submittals and communications required pursuant to Part 61 which were previously to be sent to the Director of the State of Washington Department of Ecology (DOE) will now be sent to the Olympic Air Pollution Control Authority or the Southwest Air Pollution Control Authority, as appropriate. The amended section is set forth below.

The Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegations which are reflected by this administrative amendment were effective on October 23, 1975 and it serves no useful purpose to delay the technical change of the addition of the local agency addresses to the Code of Federal Regulations.

This rulemaking is effective immediately, and is issued under the authority of Section 112 of the Clean Air Act, as amended. 42 U.S.C. 1857c-7.

Dated: January 24, 1976.

STANLEY W. LEGRO,
Assistant Administrator for Enforcement.

Part 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

1. In § 61.04, paragraph (b) is amended by adding subparagraphs (WW) (vi) and (vii) to read as follows:

§ 61.04 Address.

* * * * *

(b) * * *

(WW) * * *

(vi) Olympic Air Pollution Control Authority, 120 East State Avenue, Olympia, Washington 98501.

(vii) Southwest Air Pollution Control Authority, Suite 7601 H, NE Hazel Dell Avenue, Vancouver, Washington 98665.

* * * * *

[FR Doc.76-2674 Filed 1-28-76;8:45 am]

14

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Delegation of Authority to State of Oregon

Pursuant to the delegation of authority for national emission standards for hazardous air pollutants (NESHAPS) to the State of Oregon on November 10, 1975, EPA is today amending 40 CFR 61.04, *Address*, to reflect this delegation. A Notice announcing this delegation is published today at 41 FR 7749 in the FEDERAL REGISTER. The amended § 61.04, which adds the address of Oregon Department of Environmental Quality to which all reports, requests, applications, submittals, and communications pursuant to this part must be addressed, is set forth below.

The Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegation which is reflected by this administrative amendment was effective on November 10, 1975, and it serves no purpose to delay the technical change of this addition of the State address to the Code of Federal Regulations.

This rulemaking is effective immediately, and is issued under the authority of Section 112 of the Clean Air Act, as amended. 42 U.S.C. 1857c-7.

Dated: February [illegible], 1976.

STANLEY W. LEGRO,
Assistant Administrator
for Enforcement.

Part 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

1. In § 61.04 paragraph (b) is amended by revising subparagraph (MM) to read as follows:

§ 61.04 Address.

* * * * *

(b) * * *

(A)–(L) * * *

(MM)—State of Oregon, Department of Environmental Quality, 1234 SW Morrison Street, Portland, Oregon 97205.

* * * * *

[FR Doc.76–4903 Filed 2-19-76;8:45 am]

FEDERAL REGISTER, VOL. 41, NO. 35—FRIDAY, FEBRUARY 20, 1976

15

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Delegation of Authority to Commonwealth of Virginia

Pursuant to the delegation of authority for national emission standards for hazardous air pollutants (NESHAPS) to the Commonwealth of Virginia on December 30, 1975, EPA is today amending 40 CFR 61.04, *Address*, to reflect this delegation. A Notice announcing this delegation is published today at 41 FR 8416 in the FEDERAL REGISTER. The amended § 61.04, which adds the address of the Virginia State Air Pollution Control Board to which all reports, requests, applications, submittals, and communications to the Administrator pursuant to this part must also be addressed, is set forth below.

The Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegation which is reflected by this administrative amendment was effective on December 30, 1975, and it serves no purpose to delay the technical change of this address to the Code of Federal Regulations.

This rulemaking is effective immediately, and is issued under the authority of section 112 of the Clean Air Act, as amended, 42 U.S.C. 1857c–7.

Dated: February 21, 1976.

STANLEY W. LEGRO,
Assistant Administrator
for Enforcement.

Part 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

1. In § 61.04, paragraph (b) is amended by revising subparagraph (VV) to read as follows:

§ 61.01 Address.

* * * * *

(b) * * *

(A)–(UU) * * *

(VV) Commonwealth of Virginia, Virginia State Air Pollution Control Board, Room 1106, Ninth Street Office Building, Richmond, Virginia 23219.

[FR Doc.76–5506 Filed 2-25-76;8:45 am]

FEDERAL REGISTER, VOL. 41, NO. 39—THURSDAY, FEBRUARY 26, 1976

16

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Delegation of Authority to State of Connecticut

Pursuant to the delegation of authority for National Emission Standards for Hazardous Air Pollutants (NESHAPS) to the State of Connecticut on December 9, 1975, EPA is today amending 40 CFR 61.04, *Address*, to reflect this delegation. A Notice announcing this delegation is published today at (41 FR 11874) in the FEDERAL REGISTER. The amended § 61.04, which adds the address to the Connecticut Department of Environmental Protection to which all reports, requests, applications, submittals, and communications to the Administrator pursuant to this part must also be addressed, is set forth below.

The Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegation which is reflected by this administrative amendment was effective on December 9, 1975, and it serves no purpose to delay the technical change of this addition of the State address to the Code of Federal Regulations.

This rulemaking is effective immediately, and is issued under the authority of Section 112 of the Clean Air Act, as amended.

(42 U.S.C. 1857c–7)

Dated: March 15, 1976.

STANLEY W. LEGRO,
Assistant Administrator
of Enforcement.

Part 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

In § 61.04 paragraph (b) is amended by revising subparagraph (H) to read as follows:

§ 61.04 Address.

* * * * *

(b) * * *

(H) State of Connecticut, Department of Environmental Protection, State Office Building, Hartford, Connecticut 06115.

* * * * *

[FR Doc.76–7968 Filed 3-19-76;8:45 am]

FEDERAL REGISTER, VOL. 41, NO. 56—MONDAY, MARCH 22, 1976

17

[FRL 528-6]

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Delegation of Authority to Commonwealth of Massachusetts

Pursuant to the delegation of authority for National Emission Standards for Hazardous Air Pollutants (NESHAPS) to the Commonwealth of Massachusetts on January 23, 1976, EPA is today amending 40 CFR 61.04, "Address, to reflect this delegation. A Notice announcing this delegation is published in the Notices section of today's FEDERAL REGISTER. The amended § 61.04, which adds the address of the Massachusetts Engineering, Division of Air Quality Control, to which all reports, requests, applications, submittals, and communications to the Administrator pursuant to this part must also be addressed, is set forth below.

The Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegation which is reflected by this administrative amendment was effective on January 23, 1976, and it serves no purpose to delay the technical change of this addition of the State address to the Code of Federal Regulations.

This rulemaking is effective immediately, and is issued under the authority of Section 112 of the Clean Air Act, as amended.

42 U.S.C. 1857c-7.

Dated: May 3, 1976.

STANLEY W. LEGRO,
*Assistant Administrator
of Enforcement.*

Part 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

In § 61.04 paragraph (b) is amended by revising subparagraph (W) to read as follows:

§ 61.04 Address.

*   *   *   *   *

(b) * * *

(W) Massachusetts Department of Environmental Quality Engineering, Division of Air Quality Control, 600 Washington Street, Boston, Massachusetts 02111.

[FR Doc.76-13824 Filed 5-12-76;8:45 am]

[FRL 530-8]

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Delegation of Authority to State of New Hampshire

Pursuant to the delegation of authority for National Emission Standards for Hazardous Air Pollutants (NESHAPS) to the State of New Hampshire on February 17, 1976, EPA is today amending 40 CFR 61.04, "Address," to reflect this delegation. A Notice announcing this delegation is published in the Notices section of today's FEDERAL REGISTER. The amended § 61.04, which adds the address of the New Hampshire Air Pollution Control Agency to which all reports, requests, applications, submittals, and communications to the Administrator pursuant to this part must also be addressed is set forth below.

The Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegation which is reflected by this administrative amendment was effective on February 17, 1976, and it serves no purpose to delay the technical change of this addition of the State address to the Code of Federal Regulations.

This rulemaking is effective immediately, and is issued under the authority of Section 112 of the Clean Air Act, as amended. 42 U.S.C. 1857c-7.

Dated: May 3, 1976.

STANLEY W. LEGRO,
*Assistant Administrator
for Enforcement.*

Part 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

In § 61.04 paragraph (b) is amended by revising subparagraph (EE) to read as follows:

§ 61.04 Address.

*   *   *   *   *

(b) * * *

(EE) New Hampshire Air Pollution Control Agency, Department of Health and Welfare, State Laboratory Building, Hazen Drive, Concord, New Hampshire 03301.

*   *   *   *   *

[FR Doc.76-13823 Filed 5-12-76;8:45 am]

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PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Delegation of Authority to State of California on Behalf of Ventura County and Northern Sonoma County Air Pollution Control Districts

Pursuant to the delegation of authority for national emission standards for hazardous air pollutants (NESHAPS) to the State of California on behalf of the Ventura County Air Pollution Control District and the Northern Sonoma County Air Pollution Control District, dated February 2, 1976, EPA is today amending 40 CFR 61.04, *Address* to reflect this delegation. A Notice announcing this delegation is published today in the Notices section of this issue. The amended § 61.04 is set forth below. It adds the addresses of the Ventura County and Northern Sonoma County Air Pollution Control Districts, to which must be addressed all reports, requests, applications, submittals, and communications pursuant to this part by sources subject to the NESHAPS located within these Air Pollution Control Districts.

The Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegation which is reflected by this administrative amendment was effective on February 2, 1976, and it serves no purpose to delay the technical change of this addition of the Air Pollution Control District addresses to the Code of Federal Regulations.

Part 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

1. Section 61.04(b) is amended by revising subparagraph (F) to read as follows:

§ 61.04 Address.

* * * * *

(b) * * *

(F) California—

Bay Area Air Pollution Control District, 939 Ellis St., San Francisco, CA 94109.

Del Norte County Air Pollution Control District, Courthouse, Crescent City, CA 95531.

Humboldt County Air Pollution Control District, 5600 S. Broadway, Eureka, CA 95501.

Kern County Air Pollution Control District, 1700 Flower St. (P.O. Box 997), Bakersfield, CA 93302.

Monterey Bay Unified Air Pollution Control District, 420 Church St. (P.O. Box 487), Salinas, CA 93901.

Northern Sonoma County Air Pollution Control District, 3313 Chanate Rd., Santa Rosa, CA 95404.

Trinity County Air Pollution Control District, Box AJ, Weaverville, CA 96093.

Ventura County Air Pollution Control District, 625 E. Santa Clara St., Ventura, CA 93001.

* * * * *

This rule making is effective immediately.

(Sec. 112 of the Clean Air Act, as amended [42 U.S.C. 1857c-7]).

Dated: May 3, 1976.

STANLEY W. LEGRO,
Assistant Administrator for Enforcement.

[FR Doc 76-15356 Filed 5-25-76;8:45 am]

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Title 40—Protection of Environment

CHAPTER I—ENVIRONMENTAL PROTECTION AGENCY

SUBCHAPTER C—AIR PROGRAMS

[FRL 564-6]

NEW SOURCE REVIEW

Delegation of Authority to the State of Georgia

The amendments below institute certain address changes for reports and applications required from operators of new sources. EPA has delegated to the State of Georgia authority to review new and modified sources. The delegated authority includes the reviews under 40 CFR Part 52 for the prevention of significant deterioration. It also includes the review under 40 CFR Part 60 for the standards of performance for new stationary sources and review under 40 CFR Part 61 for national emission standards for hazardous air pollutants.

A notice announcing the delegation of authority is published elsewhere in the Notices section this issue of the FEDERAL REGISTER. These amendments provide that all reports, requests, applications, submittals, and communications previously required for the delegated reviews will now be sent instead to the Environmental Protection Division, Georgia Department of Natural Resources, 270 Washington Street SW., Atlanta, Georgia 30334, instead of EPA's Region IV.

The Regional Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegation which is reflected by this administrative amendment was effective on May 3, 1976, and it serves no purpose to delay the technical change of this addition of the State address to the Code of Federal regulations.

This rulemaking is effective immediately, and is issued under the authority of Sections 101, 110, 111, 112 and 301 of the Clean Air Act, as amended 42 U.S.C. 1857, 1857C-5, 6, 7 and 1857g.

Dated: June 11, 1976.

JACK E. RAVAN,
Regional Administrator.

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

DELEGATION OF AUTHORITY TO THE STATE OF GEORGIA

Part 61 of Chapter I, Title 40, Code of Federal Regulations, is amended as follows:

3. In § 61.04, paragraph (b)(L) is revised to read as follows:

§ 61.04 Address.

* * * * *

(b) * * *

(L) State of Georgia, Environmental Protection Division, Department of Natural Resources, 270 Washington Street, S.W., Atlanta, Georgia 30334.

* * * * *

[FR Doc.76-17911 Filed 6-18-76;8:45 am]

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PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Delegation of Authority to State of California on Behalf of Fresno, Mendocino, San Joaquin, and Sacramento County Air Pollution Control Districts

Pursuant to the delegation of authority for national emission standards for hazardous air pollutants (NESHAPS) to the State of California on behalf of the Fresno County Air Pollution Control District, the Mendocino County Air Pollution Control District, the San Joaquin County Air Pollution Control District, and the Sacaramento County Air Pollution Control District, dated March 29, 1976, EPA is today amending 40 CFR 61.04, *Address*, to reflect this delegation. A Notice announcing this delegation is published today in the Notice Section of this issue. The amended § 61.04 is set forth below. It adds the addresses of the Fresno County, Mendocino County, San Joaquin County, and Sacramento County Air Pollution Control Districts, to which must be addressed all reports, requests, applications, submittals, and communications pursuant to this part by sources subject to the NESHAPS located within these Air Pollution Control Districts.

The Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegation which is reflected by this administrative amendment was effective on March 29, 1976, and it serves no purpose to delay the technical change of this addition of the Air Pollution Control District addresses to the Code of Federal Regulations.

This rulemaking is effective immediately, and is issued under the authority of section 112 of the Clean Air Act, as amended [42 U.S.C. 1857c–7].

Dated: June 16, 1976.

STANLEY W. LEGRO,
Assistant Administrator for Enforcement.

Part 61 of Chapter I, Title 40, of the Code of Federal Regulations, is amended as follows:

1. In § 61.04 paragraph (b) is amended by revising subparagraph F to read as follows:

§ 61.04 Address.

* * * * *

(b) * * *
(A)–(E) * * *
(F) California:

Bay Area Air Pollution Control District, 939 Ellis St., San Francisco, CA 94109
Del Norte County Air Pollution Control District, Courthouse, Crescent City, CA 95531
Fresno County Air Pollution Control District, 515 S. Cedar Avenue, Fresno, CA 93702
Humboldt County Air Pollution Control District, 5600 S. Broadway, Eureka, CA 95501
Kern County Air Pollution Control District, 1700 Flower St. (P.O. Box 997), Bakersfield, CA 93302
Mendocino County Air Pollution Control District, County Courthouse, Ukiah, CA 95482
Monterey Bay Unified Air Pollution Control District, 420 Church St. (P.O. Box 487), Salinas, CA 93901
Northern Sonoma County Air Pollution Control District, 3313 Chanate Rd., Santa Rosa, CA 95404
Sacramento County Air Pollution Control District, 2221 Stockton Blvd., Sacramento, CA 95827
San Joaquin County Air Pollution Control District, 1601 E. Hazelton St. (P.O. Box 2009), Stockton, CA 95201
Trinity County Air Pollution Control District, Box AJ, Weaverville, CA 96093
Ventura County Air Pollution Control District, 625 E. Santa Clara St., Ventura, CA 93001

* * * * *

[FR Doc.76-19570 Filed 7-7-76;8:45 am]

FEDERAL REGISTER, VOL. 41, NO. 132
THURSDAY, JULY 8, 1976

FEDERAL REGISTER, VOL. 41, NO. 154
MONDAY, AUGUST 9, 1976

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[FRL 597-2]

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Delegation of Authority to State of California on Behalf of Madera County Air Pollution Control District

Pursuant to the delegation of authority for national emission standards for hazardous air pollutants (NESHAPS) to the State of California on behalf of the Madera County Air Pollution Control District, dated May 12, 1976, EPA is today amending 40 CFR 61.04, *Address*, to reflect this delegation. A Notice announcing this delegation is published today in the notices section of this issue of the FEDERAL REGISTER, Environmental Protection Agency, FRL 596-8. The amended § 61.04 is set forth below. It adds the address of the Madera County to which must be addressed all reports, requests, applications, submittals, and communications pursuant to this part by sources subject to the NESHAPS located within Air Pollution Control District.

The Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegation which is reflected by this administrative amendment was effective on May 12, 1976, and it serves no purpose to delay the technical change of this addition of the Air Pollution Control District address to the Code of Federal Regulations.

This rule making is effective immediately, and is issued under the authority of Section 112 of the Clean Air Act, as amended [42 U.S.C. 1857c–7].

Dated: July 27, 1976.

PAUL DEFALCO,
Regional Administrator, Region IX, EPA.

Part 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

1. In § 61.04 paragraph (b) is amended by revising subparagraph F to read as follows:

§ 61.04 Address.

* * * * *

(b) * * *

F—CALIFORNIA

Bay Area Pollution Control District, 939 Ellis St., San Francisco, CA 94109
Del Norte County Air Pollution Control District, Courthouse, Crescent City, CA 95531
Fresno County Air Pollution Control District, 515 S. Cedar Avenue, Fresno, CA 93702
Humboldt County Air Pollution Control District, 5600 S. Broadway, Eureka, CA 95501
Kern County Air Pollution Control District, 1700 Flower St. (P.O. Box 997), Bakersfield, CA 93302
Madera County Air Pollution Control District, 135 W. Yosemite Avenue, Madera, CA 93637
Mendocino County Air Pollution Control District, County Courthouse, Ukiah, CA 95482
Monterey Bay Unified Air Pollution Control District, 420 Church St. (P.O. Box 487), Salinas, CA 93901
Northern Sonoma County Air Pollution Control District, 3313 Chanate Rd., Santa Rosa, CA 95404
Sacramento County Air Pollution Control District, 2221 Stockton Blvd., Sacramento, CA 95827
San Joaquin County Air Pollution Control District, 1601 E. Hazelton St. (P.O. Box 2009), Stockton, CA 95201
Trinity County Air Pollution Control District, Box AJ, Weaverville, CA 96093
Ventura County Air Pollution Control District, 625 E. Santa Clara St., Ventura, CA 93001

* * * * *

[FR Doc.76-23147 Filed 8-6-76;8:45 am]

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[FRL 600-5]

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Delegation of Authority to the U.S. Virgin Islands

Pursuant to the delegation of authority for national emission standards for hazardous air pollutants (NESHAPS) to the U.S. Virgin Islands on June 30, 1976, EPA is today amending 40 CFR 61.04, Address, to reflect this delegation. A Notice announcing this delegation is published at page 34685 of today's FEDERAL REGISTER. The amended § 61.04, which adds the address of the U.S. Virgin Islands Department of Conservation and Cultural Affairs, to which all reports, requests, applications, submittals, and communications to the Administrator pursuant to this part must also be addressed, is set forth below.

The Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegation which is reflected by this administrative amendment was effective on June 30, 1976, and it serves no purpose to delay the technical change of this addition of the U.S. Virgin Islands address to the Code of Federal Regulations.

This rulemaking is effective immediately, and is issued under the authority of Section 112 of the Clean Air Act, as amended.

(42 U.S.C. 1857c-7)

Dated: August 4, 1976.

GERALD M. HANSLER,
Regional Administrator,
Region II.

Part 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

1. In § 61.04 paragraph (b) is amended by revising subparagraph (CCC) to read as follows:

§ 61.04 Address.

* * * * *

(b) * * *

(BBB) * * *

(CCC)—U.S. Virgin Islands: U.S. Virgin Islands Department of Conservation and Cultural Affairs, P.O. Box 578, Charlotte Amalie, St. Thomas, U.S. Virgin Islands 00801.

[FR Doc.76-23899 Filed 8-13-76;8:45 am]

FEDERAL REGISTER, VOL. 41, NO. 159

MONDAY, AUGUST 16, 1976

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PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

6. By revising § 61.15 to read as follows:

§ 61.15 Availability of information.

The availability to the public of information provided to, or otherwise obtained by, the Administrator under this part shall be governed by Part 2 of this chapter.

FEDERAL REGISTER, VOL. 41, NO. 171

WEDNESDAY, SEPTEMBER 1, 1976

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[FRL 617-3]

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Delegation of Authority to State of California on Behalf of Stanislaus County Air Pollution Control District; Delegation of Authority to State of California on Behalf of Sacramento County Air Pollution Control District; Correction

Pursuant to the delegation of authority for national emission standards for hazardous air pollutants (NESHAPS) to the State of California on behalf of the Stanislaus County Air Pollution Control District, dated July 2, 1976, EPA is today amending 40 CFR 61.04, *Address*, to reflect this delegation. A notice announcing this delegation is published today at 41 FR 40107. The amended § 61.04 is set forth below. It adds the address of the Stanislaus County Air Pollution Control District to which must be addressed all reports, requests, applications, submittals, and communications pursuant to this part by sources subject to the NESHAPS located within Air Pollution Control District.

On July 8, 1976, EPA amended 40 CFR 61.04, *Address*, to reflect delegation of authority for NESHAPS to the State of California on behalf of the Sacramento County Air Pollution Control District. By letter of July 30, 1976, Colin T. Greenlaw, M.D., Sacramento County Air Pollution Control Officer, notified EPA that the address published at 41 FR 27967 was incorrect. Therefore, EPA is today also amending 40 CFR 61.04, *Address* to reflect the correct address for the Sacramento County Air Pollution Control District.

The Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegations which are reflected by this administrative amendment were effective on July 2, 1976 and March 29, 1976 and it serves no purpose to delay the technical change of these additions of the Air Pollution Control Districts addresses to the Code of Federal Regulations.

This rulemaking is effective immediately, and is issued under the authority of Section 112 of the Clean Air Act, as amended (42 U.S.C. 1857c-7).

Dated: September 8, 1976.

L. RUSSELL FREEMAN,
Acting Regional Administrator, Region IX, Environmental Protection Agency.

Part 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

1. In § 61.04 paragraph (b)(F) is revised to read as follows:

§ 61.04 Address.

* * * * *

(b) * * *

(F)—California:

Bay Area Air Pollution Control District, 939 Ellis St., San Francisco, CA 94109
Del Norte County Air Pollution Control District, Courthouse, Crescent City, CA 95531
Fresno County Air Pollution Control District, 515 S. Cedar Avenue, Fresno, CA 93702
Humboldt County Air Pollution Control District, 5600 S. Broadway, Eureka, CA 95501
Kern County Air Pollution Control District, 1700 Flower St. (P.O. Box 997), Bakersfield, CA 93302
Madera County Air Pollution Control District, 135 W. Yosemite Avenue, Madera, CA 93637
Mendocino County Air Pollution Control District, County Courthouse, Ukiah, CA 95482
Monterey Bay Unified Air Pollution Control District, 420 Church St. (P.O. Box 487), Salinas, CA 93901
Northern Sonoma County Air Pollution Control District, 3313 Chanate Rd., Santa Rosa, CA 95404
Sacramento County Air Pollution Control District, 3701 Branch Center Road, Sacramento, CA 95827
San Joaquin County Air Pollution Control District, 1601 Hazleton St. (P.O. Box 2009), Stockton, CA 95201
Stanislaus County Air Pollution Control District, 820 Scenic Drive, Modesto, CA 95350
Trinity County Air Pollution Control District, Box AJ, Weaverville, CA 96093
Ventura County Air Pollution Control District, 625 E. Santa Clara St., Ventura, CA 93001

* * * * *

[FR Doc.76-27176 Filed 9-16-76;8:45 am]

FEDERAL REGISTER, VOL. 41, NO. 182—FRIDAY, SEPTEMBER 17, 1976

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Title 40—Protection of Environment

CHAPTER I—ENVIRONMENTAL PROTECTION AGENCY

[FRL 619-1]

SUBCHAPTER C—AIR PROGRAMS

PART 60—STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Reports and Applications From Operaters of New Sources; Address Changes

DELEGATION OF AUTHORITY TO THE STATE OF ALABAMA

The amendments below institute certain address changes for reports and applications required from operators of new sources. EPA has delegated to the State of Alabama authority to review new and modified sources. The delegated authority includes the review under 40 CFR Part 60 for the standards of performance for new stationary sources and review under 40 CFR Part 61 for national emission standards for hazardous air pollutants.

A notice announcing the delegation of authority is published elsewhere in this issue of the FEDERAL REGISTER. These amendments provide that all reports, requests, applications, submittals, and communications previously reuired for the delegated reviews will now be sent instead to the Air Pollution Control Division, Alabama Air Pollution Control Commission, 645 South McDonough Street, Montgomery, Alabama 36104, instead of EPA's Region IV.

The Regional Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegation which is reflected by this administrative amendment was effective on August 5, 1976, and it serves no purpose to delay the technical change of this addition of the State adoress to the Code of Federal Regulations.

This rulemaking is effective immediately, and is issued under the authority of sections 111, 112, and 301 of the Clean Air Act, as amended 42 U.S.C. 1857, 1857c-5, 6, 7 and 1857g.

Dated: September 9, 1976.

JACK E. LAVAN,
Regional Administrator.

Part 61 of Chapter I, Title 40, Code of Federal Regulations, is amended as follows:

2. In § 61.04, paragraph (b) is amended by revising subparagraph (B) to read as follows:

§ 61.04 Address.

* * * * *

(b) * * *

(B) State of Alabama, Air Pollution Control Division, Air Pollution Control Commission, 645 S. McDonough Street, Montgomery, Alabama 36104.

* * * * *

[FR Doc.76-27997 Filed 9-17-76;8:45 am]

FEDERAL REGISTER, VOL. 41, NO. 183—MONDAY, SEPTEMBER 20, 1976

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PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Delegation of Authority to the State of Indiana

Pursuant to the delegation of authority for national emission standards for hazardous air pollutants (NESHAPS) to the State of Indiana on April 21, 1976, EPA is today amending 40 CFR 61.04, *Address*, to reflect this delegation. A notice announcing this delegation is published Thursday, September 30, 1976 (41 FR 43237). The amended § 61.04, which adds the address of the Indiana Air Pollution Control Board to that list of addresses to which all reports, requests, applications, submittals, and communications to the Administrator pursuant to this part must be sent, is set forth below.

The Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegation which is reflected by this administrative amendment was effective on April 21, 1976, and it serves no purpose to delay the technical change of this addition of the State address to the Code of Federal Regulations.

This rulemaking is effective immediately.

(Sec. 112 of the Clean Air Act, as amended. 42 U.S.C. 1857c-7.)

Dated: September 22, 1976.

GEORGE R. ALEXANDER, Jr.,
Regional Administrator.

Part 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

1. In 61.04, paragraph (b) is amended by revising subparagraph P. to read as follows:

§ 61.04 Address.

* * * * *

(b) * * *

(A)-(O) * * *

(*P*) State of Indiana, Indiana Air Pollution Control Board, 1330 West Michigan Street, Indianapolis, Indiana 46206.

* * * * *

[FR Doc.76-28507 Filed 9-29-76;8:45 am]

FEDERAL REGISTER, VOL. 41, NO. 191
THURSDAY, SEPTEMBER 30, 1976

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Title 40—Protection of Environment

CHAPTER I—ENVIRONMENTAL PROTECTION AGENCY

SUBCHAPTER C—AIR PROGRAMS

[FRL 629-8]

PART 60—STANDARDS OF PERFORMANCE FOR STATIONARY SOURCES

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Delegation of Authority to State of North Dakota

Pursuant to the delegation of authority for the standards of performance for new sources (NSPS) and national emission standards for hazardous air pollutants (NESHAPS) to the State of North Dakota on August 30, 1976, EPA is today amending respectively 40 CFR 60.4 and 61.04 Address, to reflect this delegation. A notice announcing this delegation is published today in the notices section. The amended §§ 60.4 and 61.04 which add the address of the North Dakota State Department of Health to which all reports, requests, applications, submittals, and communications to the Administrator pursuant to these parts must also be addressed, are set forth below.

The Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegation which is reflected by this administrative amendment was effective on August 30, 1976, and it serves no purpose to delay the technical change of this addition to the State address to the Code of Federal Regulations.

This rulemaking is effective immediately, and is issued under the authority of sections 111 and 112 of the Clean Air Act, as amended, (42 U.S.C. 1857c-6 and -7).

Dated: October 1, 1976.

JOHN A. GREEN,
Regional Administrator.

Parts 60 and 61 of Chapter I, Title 40 of the Code of Federal Regulations are respectively amended as follows:

2. In § 61.04, paragraph (b) is amended by revising subparagraph (JJ) to read as follows:

§ 61.04 Address.

* * * * *

(b) * * *

(A)-(Z) * * *

(AA)-(ZZ) * * *

(*JJ*)—State of North Dakota, State Department of Health, State Capitol, Bismarck, North Dakota 58501.

* * * * *

[FR Doc.76-30020 Filed 10-12-76;8:45 am]

FEDERAL REGISTER, VOL. 41, NO. 199—WEDNESDAY, OCTOBER 13, 1976

Title 40—Protection of Environment

CHAPTER I—ENVIRONMENTAL PROTECTION AGENCY

SUBCHAPTER C—AIR PROGRAMS

[FRL 618-1]

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Standard for Vinyl Chloride

On December 24, 1975, under section 112 of the Clean Air Act, as amended (42 U.S.C. 1857), the Environmental Protection Agency (EPA) added vinyl chloride to the list of hazardous air pollutants (40 FR 59477) and proposed a national emission standard for it (40 FR 59532). The standard covers plants which manufacture ethylene dichloride, vinyl chloride, and/or polyvinyl chloride.

EPA decided to regulate vinyl chloride because it has been implicated as the causal agent of angiosarcoma and other serious disorders, both carcinogenic and noncarcinogenic, in people with occupational exposure and in animals with experimental exposure to vinyl chloride. Reasonable extrapolations from these findings cause concern that vinyl chloride may cause or contribute to the same or similar disorders at present ambient air levels. The purpose of the standard is to minimize vinyl chloride emissions from all known process and fugitive emission sources in ethylene dichloride-vinyl chloride and polyvinyl chloride plants to the level attainable with best available control technology. This will have the effect of furthering the protection of public health by minimizing the health risks to the people living in the vicinity of these plants and to any additional people who are exposed as a result of new construction.

Interested parties participated in the rulemaking by sending comments to EPA. The comments have been carefully considered, and where determined by the Administrator to be appropriate, changes have been made to the regulation as promulgated.

SUMMARY OF THE STANDARD

In ethylene dichloride-vinyl chloride plants, the standard limits vinyl chloride emissions from the ethylene dichloride and vinyl chloride formation and purification processes to 10 ppm. For the oxychlorination process, vinyl chloride emissions are limited to 0.2 g/kg of ethylene dichloride product.

In polyvinyl chloride plants, the standard limits vinyl chloride emissions from equipment preceding and including the stripper in the plant process flow to 10 ppm. Emissions from equipment following the stripper are to be controlled by stripping dispersion resins to 2000 ppm and other resins to 400 ppm, or by using equivalent controls. Vinyl chloride emissions from reactor opening are to be reduced to 0.02 g/kg polyvinyl chloride product.

In both ethylene dichloride-vinyl chloride and polyvinyl chloride plants, relief valve discharges and manual venting of gases are prohibited except under emergency conditions. Fugitive emissions are required to be captured and controlled.

HEALTH AND ENVIRONMENTAL IMPACTS

EPA prepared a document entitled the *Quantitative Risk Assessment for Community Exposure to Vinyl Chloride* which estimates the risk from vinyl chloride exposure to populations living in the vicinity of vinyl chloride-emitting plants before and after implementation of controls to meet the standard. There are no dose-response data for the concentrations of vinyl chloride found in the ambient air. Therefore, assessments of risk at ambient levels of exposure were extrapolated from dose-response data from higher levels of exposure using both a linear model and a log-probit model. Extrapolations made with each of these models entailed using different sets of assumptions. Because different assumptions can be made in extrapolating to low doses, the health risks are reported in ranges.

It was estimated that 4.6 million people live within 5 miles of ethylene dichoride-vinyl chloride and polyvinyl chloride plants and that the average exposure around these plants before installation of controls to meet the standard is 17 parts per billion. The exposure levels for uncontrolled plants were calculated based on estimated 1974 emission levels. Using the linear dose-response model, EPA found that the rate of initiation of liver angiosarcoma among people living around uncontrolled plants is expected to range from less than one to ten cases of liver angiosarcoma per year of exposure to vinyl chloride. The log-probit model gave predictions that are 0.1 to 0.01 times this rate. This wide range is an indication of the uncertainties in extrapolation to low doses. Due to the long latency time observed in cancer cases resulting from vinyl chloride exposure, increases initiated by exposure this year will not be diagnosed until the 1990's or later. Vinyl chloride is also estimated to produce an equal number of primary cancers at other sites, for a total of somewhere between less than one and twenty cases of cancer per year of exposure among residents around plants. The number of these effects is expected to be reduced at least in proportion to the reduction in the ambient annual average vinyl chloride concentration, which is expected to be 5 percent of the uncontrolled levels after the standard is implemented.

Changes in the standard since proposal do not affect the level of control required. Thus, the environmental impact of the promulgated standard is, with one exception, the same as that described in Chapter 6 of Volume I of the *Standard Support and Environmental Impact Statement*. According to data submitted by the Society of Plastics Industry, Inc. (SPI), the impact on water consumption in the draft environmental impact statement was overstated. In estimating the impact on water consumption, EPA based its estimates on worst case conditions. That is, EPA assumed that those control systems with the greatest water usage would be employed and that there would be no recycling of water. There is no regulation which would require water recycling. According to SPI, the control system utilizing the most water will not be used generally by the industry and economic factors will cause plants to recycle much of the water. Therefore, according to SPI the impact of the standard on water consumption will be negligible.

The environmental impacts of the promulgated standard may be summarized as follows: The primary environmental impacts of the standard are beneficial and will consist of vinyl chloride emission reductions of approximately 94 percent at ethylene dichloride-vinyl chloride plants and 95 percent at polyvinyl chloride plants. Percentage numbers for both source categories are based on an estimated 90 percent reduction in fugitive emissions and 1974 emission levels.

The potential secondary environmental impacts of the standard are either insignificant or will be minimized without additional action, except for one adverse impact. Hydrogen chloride is already emitted by process equipment at ethylene dichloride-vinyl chloride plants and by other petrochemical plants in the complexes where ethylene dichloride-vinyl chloride plants are typically located. An incinerator used to attain the standard at an ethylene dichloride-vinyl chloride plant could increase hydrogen chloride emissions by several fold. Typically, however, due to the corrosion problems which would otherwise occur both on plant property and in the community, plants use scrubbers to control already existing hydrogen chloride emissions. Hydrogen chloride emissions resulting from control of vinyl chloride emissions are expected to be controlled for the same reason. If even a moderately efficient scrubber (98 percent control) were used to control the hydrogen chloride emissions resulting from incineration of vinyl chloride emissions, the increase in hydrogen chloride emissions from a typical ethylene dichloride-vinyl chloride plant due to the standard would be reduced to 35 percent. However, EPA plans to further evaluate the need to control hydrogen chloride emissions, since diffusion model results indicate that under "worst-case" meteorological conditions, the hydrogen chloride emissions from the process equipment and the incinerator combined would cause maximum ambient concentrations of hydrogen chloride in the vicinity of ethylene dichloride-vinyl chloride plants to be in the same range or somewhat higher than existing foreign standards and National Academy of Sciences (NAS) guidelines for public exposure.

ECONOMIC IMPACT

In accordance with Executive Order 11821 and OMB circular A-107, EPA carefully evaluated the economic and inflationary impact of the proposed standard and alternative control levels and certified this in the preamble to the proposed standard. These impacts are discussed in Chapter 7 of Volume I of the *Standard Support and Environmental Impact Statement*. Comments on the proposed standard have resulted in only one major change in the economic impact analysis. EPA estimated that there would be four plant closures as a result of the promulgated standard. Of the four plants identified as possible closure candidates, one has given notice that it no longer produces polyvinyl chloride and the other three have indicated that they do not intend to close as a result of the standard.

The economic impacts of the promulgated standard may be summarized as follows: The total capital cost for existing plants to meet the standard is estimated to be $198 million, of which $15 million is for ethylene dichloride-vinyl chloride plants and $183 million is for polyvinyl chloride plants. EPA estimates that these plants will have to spend $70 million per year to maintain the required emission levels. In addition, the total capital cost for existing plants to meet the EPA's 1983 water effluent guideline limitations is expected to be $83 million and the total annualized operation cost is $17 million. The costs to the industry of meeting the OSHA standard cannot be quantified at this time, but they are expected to overlap to some degree with the costs to meet EPA's fugitive emission regulations. The costs of meeting the fugitive emission regulations are included in the total costs cited above for meeting the promulgated regulation. Broken out separately, the capital cost of meeting the fugitive emission regulations is $37 million and the annualized cost is $25 million.

The standard is not expected to deter construction of new ethylene dichloride-vinyl chloride plants or most types of new polyvinyl chloride plants. For one type of polyvinyl chloride plant (dispersion process) that represents 13 percent of the industry production, the standard would significantly deter the construction of smaller plants.

It is estimated that the price of polyvinyl chloride resins will rise by approximately 7.3 percent in order to maintain precontrol profitability and also to recover the total annualized control costs necessitated by the standard at ethylene dichloride-vinyl chloride plants and polyvinyl chloride plants. This increase is estimated to translate into a maximum consumer price increase in goods fabricated from polyvinyl chloride resins of approximately 3.5 percent. Recovery of effluent annualized costs plus maintenance of precontrol profitability is estimated to add approximately 2 percent to polyvinyl chloride resin prices and result in an additional maximum consumer price increase of 1 percent.

PUBLIC PARTICIPATION

During the public comment period, 50 comment letters on the proposed standard were received. There were 24 from industry; 3 from environmental groups; 15 from Federal, State, and local agencies; and 8 from individual citizens. As required by section 112(b)(1)(B) of the Act, a public hearing was held on the proposed standard on February 3, 1976, in Washington, D.C. Presentations were made by the Environmental Defense Fund, the Society of the Plastics Industry, Inc., Dow Chemical Company, Diamond Shamrock Corporation, and Air Products and Chemicals, Inc. Copies of the comment letters received, the public hearing record, and a summary of the comments with EPA's responses are available for public inspection and copying at the EPA Public Information Reference Unit, Room 2922 (EPA Library), 401 M Street, SW., Washington, D.C. In addition, copies of the comment summary and Agency responses may be obtained upon written request from the Public Information Center (PM-215), Environmental Protection Agency, 401 M Street, SW., Washington, D.C. 20460 (specify *Standard Support and Environmental Impact Statement, Emission Standard for Vinyl Chloride, Volume II*).

SIGNIFICANT COMMENTS AND CHANGES TO THE PROPOSED REGULATION

(1) *Decision to list vinyl chloride as a hazardous air pollutant*. In general, the commenters did not contest EPA's decision to list vinyl chloride as a hazardous air pollutant. However, three commenters (two companies and one Federal agency) argued that EPA placed undue emphasis on factors suggesting that vinyl chloride presented a health risk and ignored factors suggesting that no significant risk was involved. Under section 112, however, EPA could remove vinyl chloride from the list of hazardous air pollutants only if information were presented to EPA that shows that vinyl chloride is clearly not a hazardous air pollutant. As discussed more fully in the comment summary, the commenters did not provide conclusive evidence that vinyl chloride is not a hazardous air pollutant which causes or contributes to death or serious illness, nor did they conclusively prove that the health risk factors emphasized by EPA were insignificant.

Several other commenters agreed with EPA's decision to list vinyl chloride as a hazardous air pollutant, but argued that EPA had overstated the health problem, the emission levels, and the projected ambient air concentrations around uncontrolled plants. With regard to the alleged overstated health problem, the commenters stated, for example, that the U.S. worker EPA discussed as having been exposed to vinyl chloride levels lower than those usually encountered in polyvinyl chloride production has been dropped from the National Institute of Occupational Safety and Health's listing of workers with angiosarcoma. EPA agrees that there are questions concerning the level of exposure and in some cases the pathology of these cases not involved directly in polyvinyl chloride and vinyl chloride production. These uncertainties are stated in the appropriate footnotes of the *Scientific and Technical Assessment Report on Vinyl Chloride and Polyvinyl Chloride* (STAR) where the angiosarcoma cases are listed. However, in spite of these uncertainties, in view of the possible exposure patterns, these cases cannot be ignored in the evaluation of the potential public health problems.

With regard to the alleged overstated emission levels, the uncontrolled emission levels reported by EPA were based on 1974 data. This qualification was stated wherever emission data were presented. EPA recognizes that emissions have been reduced since that time, and stated this in the preamble to the proposed standard. EPA decided not to gather more recent data on emission levels, because these emission levels are expected to change, and gathering the data would take considerable time both on the part of EPA and on the part of industry. Since the purpose of the standard is to minimize emissions, these more current data would not affect the standard itself. The 1974 emission levels were also used in diffusion modeling to project maximum ambient air concentrations around uncontrolled plants. These maximum air concentrations would probably be lower if 1976 emission levels were used. This would reduce the relative impact of the standard below that described in the *Standard Support and Environmental Impact Statement*, but would not affect the basis of the standard itself.

(2) *Approach for Regulating Vinyl Chloride Under Section 112*. Two approaches other than using best available control technology were suggested by the commenters for regulating vinyl chloride under section 112. The first was to ban polyvinyl chloride products for which substitutes are currently available and to gradually phase out other polyvinyl chloride products as substitutes are developed.

In the preamble to the proposed standard EPA specified its reasons for not setting a zero emission limit for vinyl chloride, as follows: (1) There are beneficial uses of vinyl chloride products for which desirable substitutes are not readily available; (2) there are potentially adverse health and environmental impacts from substitutes which have not been thoroughly studied; (3) there are a number of employees, particularly in the fabrication industries, who would become at least temporarily unemployed; and (4) control technology is available which is capable of substantially reducing emissions of vinyl chloride into the atmosphere.

EPA agrees that substitutes do exist or could be manufactured for most polyvinyl chloride uses. However, in general, these substitutes do not have some of the more desirable characteristics of polyvinyl chloride, such as nonflammability. If vinyl chloride and polyvinyl chloride were banned, other substitutes with these more desirable characteristics would likely be developed. There is a risk that these substitutes would also have adverse health or environmental effects. Since control measures are available which can reduce vinyl chloride emissions by 90 percent or more, it does not seem prudent to reduce emissions by the remaining percentage and take the risk of introducing new untested chemicals into the environment.

Another approach suggested by the commenters was to base the standard for each individual emission point on cost versus benefit. Several of the fugitive emission sources were named specifically as ones for which the costs of control were substantially higher than the benefits. Although EPA did determine a cost-benefit ratio for the controls required for a number of emission points, EPA does not believe such a ratio is an appropriate basis on which to set a standard. Section 111 of the Clean Air Act provides for the development of standards based on best control technology (considering costs). Even under section 111, however, standards are not based on a fine balancing of costs versus benefits. Instead, costs are considered in terms of the affordability of the control technology required to achieve a given emission level and the economic impact of possible standards on the industry in question. Unlike section 111, section 112 does not explicitly provide for consideration of costs, so it would clearly be inappropriate to consider costs to a greater extent under section 112 than would be done under section 111. As discussed in the preamble to the proposed standard for vinyl chloride, EPA believes costs may be considered under section 112, but only to a very limited extent; i.e., to assure that the costs of control technology are not grossly disproportionate to the amount of emission reduction achieved. In comparison with other emission points, the costs of controlling the fugitive emission sources mentioned by the commenters are relatively small compared with the amount of emission reduction achieved.

Several commenters recommended adding to the regulation a provision for excess emissions during startup, shutdown, and malfunction. EPA considered this comment, and decided that this addition is not necessary for the vinyl chloride standard. Startup and shutdown of the process has essentially no effect on emissions to the atmosphere for polyvinyl chloride production, and technology exists to avoid excess emissions during startup and shutdown at ethylene dichloridevinyl chloride plants. We do not believe plants should be allowed to emit excess emissions during malfunctions, and therefore are requiring them to shut down immediately.

(3) *Selection of source categories.* In the preamble to the proposed standard EPA recognized that some small research and development facilities may exist where the emissions of vinyl chloride are insignificant and covering these facilities under the standard would be unnecessary and inappropriate. However, EPA did not have sufficient information available to clearly define which facilities should be excluded from the standard, and encouraged interested parties to submit such information during the comment period. Based on the information submitted, EPA decided to exempt polyvinyl chloride reactors and associated equipment from applicability of all parts of the standard if the reactors are used in research and development and have a capacity of no more than 0.19 m^3 (50 gal). Reactors in this size range can generally be found in a laboratory, whereas the larger reactors are typically pilot scale facilities. Emissions from laboratory scale equipment are relatively small, and application of the controls required by the standard would be expensive and impractical. EPA also decided to exempt research and development facilities containing reactors greater than 0.19 m^3 (50 gal) and no more than 4.07 m^3 (1100 gal) in capacity from all parts of the standard except the 10 ppm limit for reactors, strippers, monomer recovery systems, and mixing, weighing and holding containers. EPA decided not to require these facilities to meet other parts of the standard because of the technical problems involved in doing so. For example, the standard for reactor opening is based in part on reducing the frequency of opening the reactor. Research and development reactors have to be opened after every batch for thorough cleaning. Also, stripping technology is developed individually for each resin in research and development equipment. Therefore, attainment of the stripping limitations in the research and development equipment would not always be possible. The 4.07 m^3 (1100 gal) figure was selected as an upper cut-off point because there are no commercial reactors smaller than this.

(4) *Emission limits.* The only major change in the emission limits between proposal and promulgation is the addition of a provision for emergency manual venting of vinyl chloride from reactors to the atmosphere. The proposed standard prohibited all manual venting to the atmosphere. In the preamble to the proposed standard, EPA invited interested persons to comment on whether permitting manual venting to the atmosphere could result in overall lower emissions. There are several methods available for preventing relief discharges from reactors, one of which is manual venting of part of the reactor contents for purposes of cooling and reduction in pressure within the reactor. The higher the temperature and pressure within the reactor, the greater the amount of vinyl chloride which has to be removed to bring the reactor under control. Manual venting can be done at a lower pressure than the pressure required to open the relief valve. For this reason manual venting can result in lower emissions than would occur by allowing the reactor to discharge through the relief valve. Furthermore, a manual vent valve is under the control of an operator and can be closed. A relief valve may become clogged with resin and not close. The result would be loss of all the reactor contents.

The contents of a reactor can be manually vented to a gasholder or other holding vessel. However, in some cases, such as during severe weather conditions, several reactors may be out of control at one time. There would be insufficient holding capacity under these conditions to manually vent the contents of all the reactors to a gasholder. Therefore, when all other measures to prevent relief valve discharges have been exhausted, manual venting will be permitted as a last resort before the relief valve opens. The same notification procedures are required for manual venting to the atmosphere as are required for relief discharges.

There are several changes in the numerical emission limits in the promulgated standard. Except for the standard for reactor opening loss, these changes simply involve conversion to the International System of Units (SI). There was an error involved in the original calculation used to derive the standard for reactor opening. Correcting this error doubles the allowable emissions. It is emphasized that the change in this standard is a correction, and not a change in the intent for the degree of control required.

The proposed standard required the installation of a rupture disc beneath each relief valve to prevent leakage from the relief valve. A provision has been added to the promulgated standard so that a rupture disc is not required if the relief valve is tied into a process line or recovery system. In this case, any leakage from the relief valve would be contained.

The regulation for obtaining vinyl chloride samples has been changed to an operating procedure. The proposed standard stated that there were to be no emissions from taking the samples. Several commenters pointed out that the use of the word "no" would make this regulation impractical to enforce. Therefore, the promulgated standard specifies the operating procedure which EPA originally intended to be used to control this source. This revision is only a change in wording and does not represent a change in the level of the standard.

The regulation for taking samples has also been revised to apply only to samples containing at least 10 percent by weight vinyl chloride. This is consistent with the other parts of the standard which apply to equipment "in vinyl chloride service." "In vinyl chloride service" distinguishes between situations where vinyl chloride is clearly involved and situations where vinyl chloride is a minor component or contaminant, and as defined in promulgated § 61.61(1) means that a piece of equipment contains or contacts either a liquid that is at least 10 percent by weight vinyl chloride or a gas that is at least 10 percent by volume vinyl chloride.

The proposed standard required a vinyl chloride monitoring system for continuously measuring vinyl chloride levels both within the plant (for leak detection) and within stacks. The proposed standard did not outline required specifications for the monitoring system, except that it was to? analyze the samples with gas chromatography, or if all hydrocarbons were assumed to be vinyl chloride, with infrared spectrophotometry, flame ion detection, or equivalent. It required that each plant submit a description of its monitoring system to EPA, so that EPA could determine whether it was acceptable or not. Comments were received indicating a need for EPA to specify some criteria for judging the acceptability of monitoring systems. The accuracy of the monitoring system would be related to the frequency of calibration. Therefore, EPA has included in the promulgated standard requirements for the frequency of calibration and procedures to be carried out in the calibration of the monitoring instruments.

The portable hydrocarbon detector required by the proposed standard was required to have a sensitivity of 5 ppm. Comments were received indicating that instruments in this sensitivity range are delicate and require continuing maintenance. The portable hydrocarbon detector is required for leak detection and for measuring vinyl chloride concentrations inside the equipment before opening it. A 5 ppm sensitivity is not needed in either case, and the required sensitivity has been changed to 10 ppm in the promulgated standard.

The proposed standard contained a single regulation for compressors. The promulgated standard has separate regulations for rotating and reciprocating compressors. This is consistent with having separate regulations for rotating and reciprocating pumps in both the proposed and promulgated standards.

Section 61.66 of the proposed standard provided for the use of equivalent methods of control which have been approved by EPA. The promulgated standard requires that the plant owner or operator submit a request for determination of equivalency within 30 days of the promulgation date if the alternative control method is intended as the initial means of control. The purpose of this is to provide time for EPA to evaluate the method before the plant has to be in compliance (for existing sources, 90 days after the promulgation date). EPA also suggests that this request for determination of equivalency be accompanied by a request for waiver of compliance pursuant to section 112(c)(1)(B)(ii) of the Act. The request for a waiver for compliance should provide for the case where EPA determines that a method is not equivalent and the plant needs to purchase other equipment. In no case will the waiver of compliance be extended beyond two years from the date of promulgation.

There are several wording clarifications which have been made in the promulgated standard. The definition for "in vinyl chloride service" (§ 60.61(1)) has been clarified by stating that it means equipment that contacts vinyl chloride as well as equipment that contains vinyl chloride. This would include such equipment as agitators.

Words have been added in §§ 61.62, 61.63, and 61.64 to clarify that the 10 ppm emission limits do not have to be met when equipment has already been opened in compliance with the regulation for opening of equipment. Equipment that has met the opening of equipment regulation can contain more than 10 ppm vinyl chloride and would be in violation of the standard if this statement were not included.

The requirements for stripping polyvinyl chloride resins to specified levels have been revised in §§ 61.64(e), 61.67(g)(3)(ii), and 61.70(c)(2)(i) so that measurement of the vinyl chloride levels in the resins is to be made immediately after stripping is completed rather than as the resin is being transferred out of the stripper. This allows a plant to carry out operations in a stripper after stripping has been completed but before it is transferred out of the stripper. This is consistent with the original intent of the standard.

The regulation for loading and unloading lines in § 61.65(b)(1) has been revised to clarify that it applies only to lines that are disconnected after each loading or unloading operation. Permanently installed pipelines that are opened infrequently for inspection or maintenance, for example, are covered by the opening of equipment regulation rather than the loading and unloading line regulation.

The regulation for inprocess wastewater in the proposed standard could have been misinterpreted to require individual treatment of wastewater streams. Section 61.65(b)(9)(i) of the promulgated standard clarifies that wastewater streams that are required to be treated (i.e., those containing greater than 10 ppm vinyl chloride) can be combined to be treated. However, wastewater streams that contain greater than 10 ppm vinyl chloride cannot be combined with wastewater streams that contain less than 10 ppm vinyl chloride before treatment; i.e., dilution cannot be used to meet the standard.

The commenters recommended several changes in the emission limits which have not been incorporated into the promulgated standard. These are discussed in the following paragraphs.

It was recommended that the requirement for double mechanical seals on pumps, compressors, and agitators be removed because the single seals currently used on this equipment have small emissions and are more reliable than double mechanical seals. EPA is aware that each fugitive emission source, such as one pump, taken by itself causes relatively small emissions. Fugitive emissions considered as a whole are a significant source of emissions, however, and the intent of the standard is to reduce these. Double mechanical seal pumps are commonly used in the industry for emission reduction. Sealless pumps or equivalent systems are available as options to double mechanical seals.

The commenters recommended increasing the averaging time for the 10 ppm limits and the emission limits for reactor opening and stripping to 30 days. Some of the commenters apparently thought that the 10 ppm limits had to be met on an instantaneous basis. However, since the performance test for determining compliance consists of three runs for a minimum of an hour each, the averaging time for the 10 ppm limit is at least three hours. Increasing the averaging time to 30 days for any of the emission limits would permit higher peak emission levels. EPA has determined that this is neither desirable nor necessary.

Some commenters requested that the stripping levels for dispersion resins be made the same as for other resins and others requested that they be made less stringent. EPA decided not to make the standard for stripping dispersion resins the same as for other resins because there is sufficient evidence to indicate that these resins are more difficult to strip than other resins. With regard to making the stripping levels for dispersion resins less stringent, only one of the eight manufacturers of dispersion resins specifically commented that the dispersion resin standard should be made less stringent. Only two of several grades of dispersion resins made by this company cannot meet the 2,000 ppm limit. The proposed standard takes into consideration that some resins are more difficult to strip than others by providing for averaging among different resins.

(5) *Testing, reporting, and recordkeeping.* There are several relatively minor changes in the testing, reporting, and recordkeeping requirements. A provision has been added to § 61.67 which requires that stack gas samples taken with Test Method 106 are to be analyzed within 24 hours. This is consistent with the requirements in the proposed Test Method 106. The promulgated standard also specifies that in averaging the results of the three runs required by Test Method 106, a time-weighted average is to be used.

One commenter requested that the oxygen content and moisture content be specified for the 10 ppm concentration standards. The proposed standard specified that the vinyl chloride concentration is to be corrected to 10 percent oxygen (wet basis) if combustion is used as the control measure. In the promulgated standard, this requirement has been expanded to all control measures.

A provision has been added to the promulgated standard which states that if a reactor is also used as a stripper, the reactor opening emissions may be determined immediately following the stripping operation. If a reactor is also used as a stripper, the resin is in the reactor when it is opened. This means that vinyl chloride in the resin which has already been stripped to acceptable levels can escape from the resin and become part of the reactor opening loss. It is EPA's intent that once a resin has been stripped to the required levels, that additional controls are not required. Under the new provision, vinyl chloride escaping from the resin after it has been stripped to acceptable levels is not counted as part of the reactor opening loss.

A section requiring continuous monitoring of stack emissions has been added to the promulgated standard. The continuous monitoring of stack emissions was required in the proposed standard. The addition of a specific paragraph for emission monitoring serves only to clarify the requirement.

The standard has been revised so that the initial report requires a "description" rather than a "detailed description" of the equipment used to control fugitive emissions. Several commenters pointed out that a detailed description would contain proprietary information. EPA agrees that a detailed description in the initial report is unnecessary. If additional information is needed, EPA can obtain it under section 114 of the Act and the plant can request confidential treatment in accordance with 40 CFR Part 2 for information it believes to be proprietary.

The proposed standard required that a semiannual report be submitted every 180 days. The promulgated standard specifies dates for the submittal of the reports. It also specifies that the first semiannual report does not have to be submitted until at least six months after the initial report is submitted.

The standard has been revised to eliminate the requirement to record the cause of any leak detected by the vinyl chloride detector, the action taken to repair the leak, and the amount of time required to repair the leak. EPA is concerned only that leaks are detected and repaired. That this has been done can be established by looking at the strip chart record of measurements made by the vinyl chloride detector. These records are still required for the portable hydrocarbon detector however.

Several commentators recommended that the companies be allowed an extra two weeks to submit to EPA data from the initial performance test. They also recommended that they submit the data by regular mail rather than registered mail. EPA has not adopted either of these recommendations. A source is supposed to be in compliance with the standard within 90 days of the promulgation of the standard. The standard requires that the emission tests be done within the 90 day period, and permits an extra 30 days for determination of results. The purpose of using registered mail is to document the fact that emission data have been sent and received. This way if the results are lost in the mail, there will be no question that they were sent.

(6) *Test method.* Test Method 106 has been changed to recognize that on a gas chromatograph equipped with a Chromosorb 102 column, acetaldehyde may interfere with the vinyl chloride peak. When a sample is expected to contain acetaldehyde, a secondary column as described in section 4.3.2 must be employed. Mass spectroscopy or another absolute analytical technique is required to confirm the vinyl chloride peak obtained with the gas chromatograph, only if peak resolution with the secondary column is not successful.

In section 4.1.4, aluminized Mylar bags can be substituted for Tedlar bags. EPA now has data to allow this substitution, provided that the samples are analyzed within 24 hours of collection.

In section 5.1.3 of Test Method 106 the requirement to use "oxygen gas" has been replaced with "oxygen gas or air, as required by the detector." Several commentors stated that most gas chromatographs are designed to use hydrogen and air for their flame detectors. When used in this way, they are capable of detecting 0.5 ppm vinyl chloride in air. This is sensitive enough for monitoring the 10 ppm emission limits stipulated in the standard.

In section 6.4 of Test Method 106 the requirement for an automatic integrator has been replaced with a requirement for a disc integrator or planimeter for measuring peak area. This change is in response to a comment which states that automatic integrators are unnecessarily elaborate and expensive.

A new section 6.5 has been added to Test Method 106 which requires determination of the water vapor content of the sampling bag by measuring the ambient temperature and pressure near the bag. The vinyl chloride concentration of the bag can then be reported on a dry basis. A provision for checking the rigid container for leaks has been added to section 7.4 of Test Method 106.

The only change in Test Method 107 is the provision in Section 5.3.2 for use of Carbopak C as well as Carbopak A.

AUTHORITY: Section 112 of the Clean Air Act as added by sec. 4(a) of Pub. L. 91-604, 84 Stat. 1685 (42 U.S.C. 1857c-7; Section 114 of the Clean Air Act, as added by sec. 4(a) of Pub. L. 91-604, 84 Stat. 1687, and amended by Pub. L. 93-319, sec. 6(a)(4), 88 Stat. 259 (42 U.S.C. 1857c-9); Section 301(a) of the Clean Air Act, as amended by sec. 15(c)(2) of Pub. L. 91-604, 84 Stat. 1713 (42 U.S.C. 1857g(a)).

Dated: October 12, 1976.

JOHN QUARLES,
Acting Administrator.

Part 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows: The table of sections for Part 61 is amended by adding a list of sections for new Subpart F and Part 61 is amended by revising the authority and adding a new Subpart F reading as follows:[30]

Subpart F—National Emission Standard for Vinyl Chloride

Sec.
61.60 Applicability.
61.61 Definitions.
61.62 Emission standard for ethylene dichloride plants.
61.63 Emission standard for vinyl chloride plants.
61.64 Emission standard for polyvinyl chloride plants.
61.65 Emission standard for ethylene dichloride, vinyl chloride and polyvinyl chloride plants.
61.66 Equivalent equipment and procedures.
61.67 Emission tests.
61.68 Emission monitoring.
61.69 Initial report.
61.70 Semiannual report.
61.71 Recordkeeping.

AUTHORITY: Section 112 of the Clean Air Act as added by sec. 4(a) of Pub. L. 91-604, 84 Stat. 1685 (42 U.S.C. 1857c-7); section 114 of the Clean Air Act, as added by sec. 4(a) of Pub. L. 91-604, 84 Stat. 1687, and amended by Pub. L. 93-319, sec. 6(a)(4), 88 Stat. 259 (42 U.S.C. 1857c-9); section 301(a) of the Clean Air Act, as amended by sec. 15(c)(2) of Pub. L. 91-604, 84 Stat. 1713 (42 U.S.C. 1857g(a)).

Subpart F—National Emission Standard for Vinyl Chloride

§ 61.60 Applicability.

(a) This subpart applies to plants which produce:

(1) Ethylene dichloride by reaction of oxygen and hydrogen chloride with ethylene,

(2) Vinyl chloride by any process, and/or

(3) One or more polymers containing any fraction of polymerized vinyl chloride.

(b) This subpart does not apply to equipment used in research and development if the reactor used to polymerize the vinyl chloride processed in the equipment has a capacity of no more than 0.19 m^3 (50 gal).

(c) Sections of this subpart other than § 61.64(a)(1), (b), (c), and (d) do not apply to equipment used in research and development if the reactor used to polymerize the vinyl chloride processed in the equipment has a capacity of greater than 0.19 m^3 (50 gal) and no more than 4.07 m^3 (1100 gal).

§ 61.61 Definitions.

Terms used in this subpart are defined in the Act, in subpart A of this part, or in this section as follows:

(a) "Ethylene dichloride plant" includes any plant which produces ethylene dichloride by reaction of oxygen and hydrogen chloride with ethylene.

(b) "Vinyl chloride plant" includes any plant which produces vinyl chloride by any process.

(c) "Polyvinyl chloride plant" includes any plant where vinyl chloride alone or in combination with other materials is polymerized.

(d) "Slip gauge" means a gauge which has a probe that moves through the gas/liquid interface in a storage or transfer vessel and indicates the level of vinyl chloride in the vessel by the physical state of the material the gauge discharges.

(e) "Type of resin" means the broad classification of resin referring to the basic manufacturing process for producing that resin, including, but not limited to, the suspension, dispersion, latex, bulk, and solution processes.

(f) "Grade of resin" means the subdivision of resin classification which describes it as a unique resin, i.e., the most exact description of a resin with no further subdivision.

(g) "Dispersion resin" means a resin manufactured in such away as to form fluid dispersions when dispersed in a plasticizer or plasticizer/diluent mixtures.

(h) "Latex resin" means a resin which is produced by a polymerization process which initiates from free radical catalyst sites and is sold undried.

(i) "Bulk resin' 'means a resin which is produced by a polymerization process in which no water is used.

(j) "Inprocess wastewater" means any water which, during manufacturing or processing, comes into direct contact with vinyl chloride or polyvinyl chloride or results from the production or use of any raw material, intermediate product, finished product, by-product, or waste product containing vinyl chloride or polyvinyl chloride but which has not been discharged to a wastewater treatment process or discharged untreated as wastewater.

(k) "Wastewater treatment process" includes any process which modifies characteristics such as BOD, COD, TSS, and pH, usually for the purpose of meeting effluent guidelines and standards; it does not include any process the purpose of which is to remove vinyl chloride from water to meet requirements of this subpart.

(l) "In vinyl chloride service" means that a piece of equipment contains or contacts either a liquid that is at least 10 percent by weight vinyl chloride or a gas that is at least 10 percent by volume vinyl chloride.

(m) "Standard operating procedure" means a formal written procedure officially adopted by the plant owner or operator and available on a routine basis to those persons responsible for carrying out the procedure.

(n) "Run" means the net period of time during which an emission sample is collected.

(o) "Ethylene dichloride purification" includes any part of the process of ethylene dichloride production which follows ethylene dichloride formation and in which finished ethylene dichloride is produced.

(p) "Vinyl chloride purification" includes any part of the process of vinyl chloride production which follows vinyl chloride formation and in which finished vinyl chloride is produced.

(q) "Reactor" includes any vessel in which vinyl chloride is partially or totally polymerized into polyvinyl chloride.

(r) "Reactor opening loss" means the emissions of vinyl chloride occurring when a reactor is vented to the atmosphere for any purpose other than an emergency relief discharge as defined in § 61.65(a).

(s) "Stripper" includes any vessel in which residual vinyl chloride is removed from polyvinyl chloride resin, except bulk resin, in the slurry form by the use of heat and/or vacuum. In the case of bulk resin, stripper includes any vessel which is used to remove residual vinyl chloride from polyvinyl chloride resin immediately following the polymerization step in the plant process flow.

§ 61.62 Emission standard for ethylene dichloride plants.

An owner or operator of an ethylene dichloride plant shall comply with the requirements of this section and § 61.65.

(a) Ethylene dichloride purification: The concentration of vinyl chloride in all exhaust gases discharged to the atmosphere from any equipment used in ethylene dichloride purification is not to exceed 10 ppm, except as provided in § 61.65(a). This requirement does not apply to equipment that has been opened, is out of operation, and met the requirement in § 61.65(b) before being opened.

(b) Oxychlorination reactor: Except as provided in § 61.65(a), emissions of vinyl chloride to the atmosphere from each oxychlorination reactor are not to exceed 0.2 g/kg the 100 percent ethylene dichloride product from the oxychlorination process.

§ 61.63 Emission standard for vinyl chloride plants.

An owner or operator of a vinyl chloride plant shall comply with the requirements of this section and § 61.65.

(a) Vinyl chloride formation and purification: The concentration of vinyl chloride in all exhaust gases discharged to the atmosphere from any equipment used in vinyl chloride formation and/or purification is not to exceed 10 ppm, except as provided in § 61.65(a). This requirement does not apply to equipment that has been opened, is out of operation, and met the requirement in § 61.65(b)(6)(i) before being opened.

§ 61.64 Emission standard for polyvinyl chloride plants.

An owner or operator of a polyvinyl chloride plant shall comply with the requirements of this section and § 61.65.

(a) Reactor: The following requirements apply to reactors:

(1) The concentration of vinyl chloride in all exhaust gases discharged to the atmosphere from each reactor is not to exceed 10 ppm, except as provided in paragraph (a)(2) of this section and § 61.65(a).

(2) The reactor opening loss from each reactor is not to exceed 0.02 g vinyl chloride/Kg (0.00002 lb vinyl chloride/lb) of polyvinyl chloride product, with the product determined on a dry solids basis. This requirement applies to any vessel which is used as a reactor or as both a reactor and a stripper. In the bulk process, the product means the gross product of prepolymerization and postpolymerization.

(3) Manual vent valve discharge: Except for an emergency manual vent valve discharge, there is to be no discharge to the atmosphere from any manual vent valve on a polyvinyl chloride reactor in vinyl chloride service. An emergency manual vent valve discharge means a discharge to the atmosphere which could not have been avoided by taking measures to prevent the discharge. Within 10 days of any discharge to the atmosphere from any manual vent valve, the owner or operator of the source from which the discharge occurs shall submit to the Administrator a report in writing containing information on the source, nature and cause of the discharge, the date and time of the discharge, the approximate total vinyl chloride loss during the discharge, the method used for determining the vinyl chloride loss, the action that was taken to prevent the discharge, and measures adopted to prevent future discharges.

(b) Stripper: The concentration of vinyl chloride in all exhaust gases discharged to the atmosphere from each stripper is not to exceed 10 ppm, except as provided in § 61.65(a). This requirement does not apply to equipment that has been opened, is out of operation, and met the requirement in § 61.65(b)(6)(i) before being opened.

(c) Mixing, weighing, and holding containers: The concentration of vinyl chloride in all exhaust gases discharged to the atmosphere from each mixing, weighing, or holding container in vinyl chloride service which precedes the stripper (or the reactor if the plant has no stripper) in the plant process flow is not to exceed 10 ppm, except as provided in § 61.65(a). This requirement does not apply to equipment that has been opened, is out of operation, and met the requirement in § 61.65(b)(6)(i) before being opened.

(d) Monomer recovery system. The concentration of vinyl chloride in all exhaust gases discharged to the atmosphere from each monomer recovery system is not to exceed 10 ppm, except as provided in § 61.65(a). This requirement does not apply to equipment that has been opened, is out of operation, and met the requirement in § 61.65(b)(6)(i) before being opened.

(e) Sources following the stripper(s): The following requirements apply to emissions of vinyl chloride to the atmosphere from the combination of all sources following the stripper(s) [or the reactor(s) if the plant has no stripper(s)] in the plant process flow including but not limited to, centrifuges, concentrators, blend tanks, filters, dryers, conveyor air discharges, baggers, storage containers, and inprocess wastewater:

(1) In polyvinyl chloride plants using stripping technology to control vinyl chloride emissions, the weighted average residual vinyl chloride concentration in all grades of polyvinyl chloride resin processed through the stripping operation on each calendar day, measured immediately after the stripping operation is completed, may not exceed:

(i) 2000 ppm for polyvinyl chloride dispersion resins, excluding latex resins;

(ii) 400 ppm for all other polyvinyl chloride resins, including latex resins, averaged separately for each type of resin; or

(2) In polyvinyl chloride plants controlling vinyl chloride emissions with technology other than stripping or in addition to stripping, emissions of vinyl chloride to the atmosphere may not exceed:

(i) 2 g/kg (0.002 lb/lb) product from the stripper(s) [or reactor(s) if the plant has no stripper(s)] for dispersion polyvinyl chloride resins, excluding latex resins, with the product determined on a dry solids basis;

(ii) 0.4 g/kg (0.0004 lb/lb) product from the strippers [or reactor(s) if the plant has no stripper(s)] for all other polyvinyl chloride resins, including latex resins, with the product determined on a dry solids basis.

§ 61.65 Emission standard for ethylene dichloride, vinyl chloride and polyvinyl chloride plants.

An owner or operator of an ethylene dichloride, vinyl chloride, and/or polyvinyl chloride plant shall comply with the requirements of this section.

(a) Relief valve discharge: Except for an emergency relief discharge, there is to be no discharge to the atmosphere from any relief valve on any equipment in vinyl chloride service. An emergency relief discharge means a discharge which could not have been avoided by taking measures to prevent the discharge. Within 10 days of any relief valve discharge, the owner or operator of the source from which the relief valve discharge occurs shall submit to the Administrator a report in writing containing information on the source, nature and cause of the discharge, the date and time of the discharge, the approximate total vinyl chloride loss during the discharge, the method used for determining the vinyl chloride loss, the action that was taken to prevent the discharge, and measures adopted to prevent future discharges.

(b) Fugitive emission sources:

(1) Loading and unloading lines: Vinyl chloride emissions from loading and unloading lines which are opened to the atmosphere after each loading or unloading operation are to be minimized as follows:

(i) After each loading or unloading operation and before opening a loading or unloading line to the atmosphere, the quantity of vinyl chloride in all parts of each loading or unloading line that are to be opened to the atmosphere is to be reduced so that the parts combined contain no greater than 0.0038 m^3 (0.13 ft^3) of vinyl chloride, at standard temperature and pressure; and

(ii) Any vinyl chloride removed from a loading or unloading line in accordance with paragraph (b)(1)(i) of this section is to be ducted through a control system from which the concentration of vinyl chloride in the exhaust gases does not exceed 10 ppm, or equivalent as provided in § 61.66.

(2) Slip gauges: During loading or unloading operations, the vinyl chloride emissions from each slip gauge in vinyl chloride service are to be minimized by ducting any vinyl chloride discharged from the slip gauge through a control system from which the concentration of vinyl chloride in the exhaust gases does not exceed 10 ppm, or equivalent as provided in § 61.66.

(3) Leakage from pump, compressor, and agitator seals:

(i) Rotating pumps: Vinyl chloride emissions from seals on all rotating pumps in vinyl chloride service are to be minimized by installing sealless pumps, pumps with double mechanical seals, or equivalent as provided in § 61.66. If double mechanical seals are used, vinyl chloride emission from the seals are to be minimized by maintaining the pressure between the two seals so that any leak that occurs is into the pump; by ducting any vinyl chloride between the two seals through a control system from which the concentration of vinyl chloride in the exhaust gases does not exceed 10 ppm; or equivalent as provided in § 61.66.

(ii) Reciprocating pumps: Vinyl chloride emissions from seals on all reciprocating pumps in vinyl chloride service are to be minimized by installing double outboard seals, or equivalent as provided in § 61.66. If double outboard seals are used, vinyl chloride emissions from the seals are to be minimized by maintaining the pressure between the two seals so that any leak that occurs is into the pump; by ducting any vinyl chloride between the two seals through a control system from which the concentration of vinyl chloride in the exhaust gases does not exceed 10 ppm; or equivalent as provided in § 61.66.

(iii) Rotating compressor: Vinyl chloride emissions from seals on all rotating compressors in vinyl chloride service are to be minimized by installing compressors with double mechanical seals, or equivalent as provided in § 61.66. If double mechanical seals are used, vinyl chloride emissions from the seals are to be minimized by maintaining the pressure between the two seals so that any leak that occurs is into the compressor; by ducting any vinyl chloride between the two seals through a control system from which the concentration of vinyl chloride in the exhaust gases does not exceed 10 ppm; or equivalent as provided in § 61.66.

(iv) Reciprocating compressors: Vinyl chloride emissions from seals on all reciprocating compressors in vinyl chloride service are to be minimized by installing double outboard seals, or equivalent as provided in § 61.66. If double outboard seals are used, vinyl chloride emissions from the seals are to be minimized by maintaining the pressure between the two seals so that any leak that occurs is into the compressor; by ducting any vinyl chloride between the two seals through a control system from which the concentration of vinyl chloride in the exhaust gases does not exceed 10 ppm; or equivalent as provided in § 61.66.

(v) Agitator: Vinyl chloride emissions from seals on all agitators in vinyl chloride service are to be minimized by installing agitators with double mechanical seals, or equivalent as provided in § 61.66. If double mechanical seals are used, vinyl chloride emissions from the seals are to be minimized by maintaining the pressure between the two seals so that any leak that occurs is into the agitated vessel; by ducting any vinyl chloride between the two seals through a control system from which the concentration of vinyl chloride in the exhaust gases does not exceed 10 ppm; or equivalent as provided in § 61.66.

(4) Leakage from relief valves: Vinyl chloride emissions due to leakage from each relief valve on equipment in vinyl chloride service are to be minimized by installing a rupture disk between the equipment and the relief valve, by connecting the relief valve discharge to a process line or recovery system, or equivalent as provided in § 61.66.

(5) Manual venting of gases: Except as provided in § 61.64(a)(3), all gases which are manually vented from equipment in vinyl chloride service are to be ducted through a control system from which the concentration of vinyl chloride in the exhaust gases does not exceed 10 ppm; or equivalent as provided in § 61.66.

(6) Opening of equipment: Vinyl chloride emissions from opening of equipment (including loading or unloading lines that are not opened to the atmosphere after each loading or unloading operation) are to be minimized as follows:

(i) Before opening any equipment for any reason, the quantity of vinyl chloride is to be reduced so that the equipment contains no more than 2.0 percent by volume vinyl chloride or 0.0950 m^3 (25 gal) of vinyl chloride, whichever is larger, at standard temperature and pressure; and

(ii) Any vinyl chloride removed from the equipment in accordance with paragraph (b)(6)(i) of this section is to be ducted through a control system from which the concentration of vinyl chloride in the exhaust gases does not exceed 10 ppm, or equivalent as provided in § 61.66.

(7) Samples: Unused portions of samples containing at least 10 percent by weight vinyl chloride are to be returned to the process, and sampling techniques are to be such that sample containers in vinyl chloride service are purged into a closed process system.

(8) Leak detection and elimination: Vinyl chloride emissions due to leaks from equipment in vinyl chloride service are to be minimized by instituting and implementing a formal leak detection and elimination program. The owner or operator shall submit a description of the program to the Administrator for approval. The program is to be submitted within 45 days of the effective date of these regulations, unless a waiver of compliance is granted under § 61.11. If a waiver of compliance is granted, the program is to be submitted on a date scheduled by the Administrator. Approval of a program will be granted by the Administrator provided he finds:

(i) It includes a reliable and accurate vinyl chloride monitoring system for detection of major leaks and identification of the general area of the plant where a leak is located. A vinyl chloride monitoring system means a device which obtains air samples from one or more points on a continuous sequential basis and analyzes the samples with gas chromatography or, if the owner or operator assumes that all hydrocarbons measured are vinyl chloride, with infrared spectrophotometry flame ion detection, or an equivalent or alternative method.

(ii) It includes a reliable and accurate portable hydrocarbon detector to be used routinely to find small leaks and to pinpoint the major leaks indicated by the vinyl chloride monitoring system. A portable hydrocarbon detector means a device which measures hydrocarbons with a sensitivity of at least 10 ppm and is of such design and size that it can be used to measure emissions from localized points.

(iii) It provides for an acceptable calibration and maintenance schedule for the vinyl chloride monitoring system and portable hydrocarbon detector. For the vinyl chloride monitoring system, a daily span check is to be conducted with a concentration of vinyl chloride equal to the concentration defined as a leak according to paragraph (b)(8)(vi) of this section. The calibration is to be done with either:

(A) A calibration gas mixture prepared from the gases specified in sections 5.2.1 and 5.2.3 of Test Method 106, or

(B) A calibration gas cylinder containing the appropriate concentration of vinyl chloride. If a calibration gas cylinder is used, the analysis must be traceable to the National Bureau of Standards or to a gravimetrically calibrated vinyl chloride permeation tube.

(iv) The location and number of points to be monitored and the frequency of monitoring provided for in the program are acceptable when they are compared with the number of pieces of equipment in vinyl chloride service and the size and physical layout of the plant.

(v) It contains an acceptable plan of action to be taken when a leak is detected.

(vi) It contains a definition of leak which is acceptable when compared with the background concentrations of vinyl chloride in the areas of the plant to be monitored by the vinyl chloride monitoring system. Measurements of background concentrations of vinyl chloride in the areas of the plant to be monitored by the vinyl chloride monitoring system are to be included with the description of the program. The definition of leak for a given plant may vary among the different areas within the plant and is also to change over time as background concentrations in the plant are reduced.

(9) Inprocess wastewater: Vinyl chloride emissions to the atmosphere from inprocess wastewater are to be reduced as follows:

(i) The concentration of vinyl chloride in each inprocess wastewater stream containing greater than 10 ppm vinyl chloride measured immediately as it leaves a piece of equipment and before being mixed with any other inprocess wastewater stream is to be reduced to no more than 10 ppm by weight before being mixed with any other inprocess wastewater stream which contains less than 10 ppm vinyl chloride; before being exposed to the atmosphere, before being discharged to a wastewater treatment process; or before being discharged untreated as a wastewater. The paragraph does apply to water which is used to displace vinyl chloride from equipment before it is opened to the atmosphere in accordance with § 61.64(a)(2) or paragraph (b)(6) of this section, but does not apply to water which is used to wash out equipment after the equipment has already been opened to the atmosphere in accordance with § 61.64(a)(2) or paragraph (b)(6) of this section.

(ii) Any vinyl chloride removed from the inprocess wastewater in accordance with paragraph (b)(9)(i) of this section is to be ducted through a control system from which the concentration of vinyl chloride in the exhaust gases does not exceed 10 ppm, or equivalent as provided in § 61.66.

(c) The requirements in paragraphs (b)(1), (b)(2), (b)(5), (b)(6), (b)(7) and (b)(8) of this section are to be incorporated into a standard operating procedure, anr made available upon request for inspection by the Administrator. The standard operating procedure is to include provisions for measuring the vinyl chloride in equipment $\geq$4.75 m^3 (1250 gal in volume for which an emission limit is prescribed in § 61.65(b)(6)(i) prior to opening the equipment and using Test Method 106, a portable hydrocarbon detector, or an equivalent or alternative method. The method of measurement is to meet the requirements in § 61.67(g)(5)(i)(A) or (g)((5)(i)(B).

§ 61.66 Equivalent equipment and procedures.

Upon written application from an owner or operator, the Administrator may approve use of equipment or procedures which have been demonstrated to his satisfaction to be equivalent in terms of reducing vinyl chloride emissions to the atmosphere to those prescribed for compliance with a specific paragraph of this subpart. For an existing source, any request for using an equivalent method as the initial measure of control is to be submitted to the Administrator within 30 days of the effective date. For a new source, any request for using an equivalent method is to be submitted to the Administrator with the application for approval of construction or modification required by § 61.07.

§ 61.67 Emission tests.

(a) Unless a waiver of emission testing is obtained under § 61.13, the owner or operator of a source to which this subpart applies shall test emissions from the source.

(1) Within 90 days of the effective date in the case of an existing source or a new source which has an initial startup date preceding the effective date, or

(2) Within 90 days of startup in the case of a new source, initial startup of which occurs after the effective date.

(b) The owner or operator shall provide the Administrator at least 30 days prior notice of an emission test to afford the Administrator the opportunity to have an observer present during the test.

(c) Any emission test is to be conducted while the equipment being tested is operating at the maximum production rate at which the equipment will be operated and under other relevant conditions as may be specified by the Administrator based on representative performance of the source.

(d) Each emission test is to consist of three runs. For the purpose of determining emissions, the average of results of all runs is to apply. The average is to be computed on a time weighted basis.

(e) All samples are to be analyzed within 24 hours, and vinyl chloride emissions are to be determined within 30 days after the emission test. The owner or operator shall report the determinations to the Administrator by a registered letter dispatched before the close of the next business day following the determination.

(f) The owner or operator shall retain at the plant and make available, upon request, for inspection by the Administrator, for a minimum of 2 years records of emission test results and other data needed to determine emissions.

(g) Unless otherwise specified, the owner or operator shall use test Test Methods in Appendix B to this part for each test as required by paragraphs (g)(1), (g)(2), (g)(3), (g)(4), and (g)(5) of this section, unless an equivalent method or an alternative method has been approved by the Administrator. If the Administrator finds reasonable grounds to dispute the results obtained by an equivalent or alternative method, he may require the use of a reference method. If the results of the reference and equivalent or alternative methods do not agree, the results obtained by the reference method prevail, and the Administrator may notify the owner or operator that approval of the method previously considered to be equivalent or alternative is withdrawn.

(1) Test Method 106 is to be used to determine the vinyl chloride emissions from any source for which an emission limit is prescribed in §§ 61.62(a) or (b), § 61.63(a), or §§ 61.64(a)(1), (b), (c), or (d), or from any control system to which reactor emissions are required to be ducted in § 61.64(a)(2) or to which fugitive emissions are required to be ducted in §§ 61.65(b)(1)(ii), (b)(2), (b)(5), (b)(6)(ii), or (b)(9)(ii).

(i) For each run, one sample is to be collected. The sampling site is to be at least two stack or duct diameters downstream and one half diameter upstream from any flow disturbance such as a bend, expansion, contraction, or visible flame. For a rectangular cross section an equivalent diameter is to be determined from the following equation:

$$\text{equivalent diameter} = 2\,\frac{(\text{length})\ (\text{width})}{\text{length} + \text{width}}$$

The sampling point in the duct is to be at the centroid of the cross section. The sample is to be extracted at a rate proportional to the gas velocity at the sampling point. The sample is to be taken over a minimum of one hour, and is to contain a minimum volume of 50 liters corrected to standard conditions.

(ii) For gas streams containing more than 10 percent oxygen, the concentration of vinyle chloride as determined by Test Method 106 is to be corrected to 10 percent oxygen for determination of emissions by using the following equation:

$$C_{b(\text{corrected})} = C_b\,\frac{10.9}{20.9 - \text{percent } O_2}$$

where:

$C_{b(\text{corrected})}$ = The concentration of vinyl chloride in the exhaust gases, corrected to 10 per-percent oxygen.

C_b = The concentration of vinyl chloride as measured by Test Method 106.

20.9 = Percent oxygen in the ambient air at standard conditions.

10.9 = Percent oxygen in the ambient air at standard conditions, minus the 10 percent oxygen to which the correction is being made.

Percent O_2 = Percent oxygen in the exhaust gas as measured by Reference Method 3 in Appendix A of Part 60 of this chapter.

(iii) For those emission sources where the emission limit is prescribed in terms of mass rather than concentration, mass emissions in kg/100 kg product are to be determined by using the following equation:

$$C_{sx}=\frac{[C_b\ (2.60)\ Q\ 10^{-6}]\ (100)}{Z}$$

where:

C_{sx} = kg vinyl chloride/100 kg product.
C_b = The concentration of vinyl chloride as measured by Test Method 106.
2.60 = Density of vinyl chloride at one atmosphere and 20°C in kg/m³.
Q = Volumetric flow rate in m³/hr as determined by Reference Method 2 of Appendix A to Part 60 of this chapter.
10^{-6} = Conversion factor for ppm.
Z = Production rate (kg/hr).

(2) Test Method 107 is to be used to determine the concentration of vinyl chloride in each inprocess wastewater stream for which an emission limit is prescribed in § 61.65(b)(9)(i).

(3) Where a stripping operation is used to attain the emission limit in § 61.64(e), emissions are to be determined using Test Method 107 as follows:

(i) The number of strippers and samples and the types and grades of resin to be sampled are to be determined by the Administrator for each individual plant at the time of the test based on the plant's operation.

(ii) Each sample is to be taken immediately following the stripping operation.

(iii) The corresponding quantity of material processed by each stripper is to be determined on a dry solids basis and by a method submitted to and approved by the Administrator.

(iv) At the prior request of the Administrator, the owner or operator shall provide duplicates of the samples required in paragraph (g)(3)(i) of this section.

(4) Where control technology other than or in addition to a stripping operation is used to attain the emission limit in § 61.64(e), emissions are to be determined as follows:

(i) Test Method 106 is to be used to determine atmospheric emissions from all of the process equipment simultaneously. The requirements of paragraph (g)(1) of this section are to be met.

(ii) Test Method 107 is to be used to determine the concentration of vinyl chloride in each inprocess wastewater stream subject to the emission limit prescribed in § 61.64(e). The mass of vinyl chloride in kg/100 kg product in each in process wastewater stream is to be determined by using the following equation:

$$C_{wx}=\frac{[C_d\ R\ 10^{-6}]\ [100]}{Z}$$

where:

C_{wx} = kg vinyl chloride/100 kg product.
C_d = the concentration of vinyl chloride as measured by Test Method 107.
R = water flow rate in l/hr, determined in accordance with a method which has been submitted to and approved by the Administrator.
10^{-6} = Conversion factor for ppm.
Z = Production rate (kg/hr), determined in accordance with a method which has been submitted and approved by the Administrator.

(5) The reactor opening loss for which an emission limit is prescribed in § 61.64(a)(2) is to be determined. The number of reactors for which the determination is to be made is to be specified by the Administrator for each individual plant at the time of the determination based on the plant's operation. For a reactor that is also used as a stripper, the determination may be made immediately following the stripping operation.

(i) Except as provided in paragraph (g)(5)(ii) of this section, the reactor opening loss is to be determined using the following equation:

$$C=\frac{W\ (2.60)\ (10^{-6})\ (Cb)}{YZ}$$

where:

C = kg vinyl chloride emissions/kg product.
W = Capacity of the reactor in m³.
2.60 = Density of vinyl chloride at one atmosphere and 20° C in kg/m³.
10^{-6} = Conversion factor for ppm.
Cb = ppm by volume vinyl chloride as determined by Test Method 106 or a portable hydrocarbon detector which measures hydrocarbons with a sensitivity of at least 10 ppm.
Y = Number of batches since the reactor was last opened to the atmosphere.
Z = Average kg of polyvinyl chloride produced per batch in the number of batches since the reactor was last opened to the atmosphere.

(A) If Method 106 is used to determine the concentration of vinyl chloride (Cb), the sample is to be withdrawn at a constant rate with a probe of sufficient length to reach the vessel bottom from the manhole. Samples are to be taken for 5 minutes within 6 inches of the vessel bottom, 5 minutes near the vessel center, and 5 minutes near the vessel top.

(B) If a portable hydrocarbon detector is used to determine the concentration of vinyl chloride (Cb), a probe of sufficient length to reach the vessel bottom from the manhole is to be used to make the measurements. One measurement will be made within 6 inches of the vessel bottom, one near the vessel center and one near the vessel top. Measurements are to be made at each location until the reading is stabilized. All hydrocarbons measured are to be assumed to be vinyl chloride.

(C) The production rate of polyvinyl chloride (Z) is to be determined by a method submitted to and approved by the Administrator.

(ii) A calculation based on the number of evacuations, the vacuum involved, and the volume of gas in the reactor is hereby approved by the Administrator as an alternative method for determining reactor opening loss for postpolymerization reactors in the manufacture of bulk resins.

§ 61.68 Emission monitoring.

(a) A vinyle chloride monitoring system is to be used to monitor on a continuous basis the emissions from the sources for which emission limits are prescribed in § 61.62(a) and (b), § 61.63(a), and § 61.64(a)(1), (b), (c), and (d), and for any control system to which reactor emission are required to be ducted in § 61.65(b)(1)(ii), and (b)(2), (b)(5), (b)(6)(ii), and (b)(9)(ii).

(b) The vinyl chloride monitoring system(s) used to meet the requirement in paragraph (a) of this section is to be a device which obtains air sampels from one or more points on a continuous sequential basis and analyzes the samples with gas chromatography or, if the owner or operator assumes that all hydrocarbons measured are vinyl chloride, with infrared spectrophotometry, flame ion detection, or an equivalent or alternative method. The vinyl chloride monitoring system used to meet the requirements in § 61.65(b)(8)(i) may be used to meet the requirements of this section.

(c) A daily span check is to be conducted for each vinyle chloride monitoring system used. For all of the emission sources listed in paragraph (a) of this section, except the one for which an emission limit is prescribed in § 61.62(b), the daily span check is to be conducted with a concentration of vinyl chloride equal to 10 ppm. For the emission source for which an emission limit is prescribed in § 61.62(b), the daily span check is to be conducted with a concentration of vinyl chloride which is determined to be determined to be equivalent to the emission limit for that source based on the emission test required by § 67.67. The calibration is to be done with either:

(1) A calibration gas mixture prepared from the gases specified in sections 5.2.1 and 5.2.3 of Test Method 106, or

(2) A calibration gas cylinder containing the appropriate concentration of vinyl chloride. If a calibration gas cylinder is used, the analysis must be traceable to the National Bureau of Standards or to a gravimetrically calibrated vinyl chloride permeation tube.

§ 61.69 Initial report.

(a) An owner or operator of any source to which this subpart applies shall submit a statement in writing notifying the Administrator that the equipment and procedural specifications in §§ 61.65 (b)(1), (b)(2), (b)(3), (b)(4), (b)(5), (b)(6), (b)(7), and (b)(8) are being implemented.

(b)(1) In the case of an existing source or a new source which has an initial startup date preceding the effective date, the statement is to be submitted within 90 days of the effective date, unless a waiver of compliance is granted under § 61.11, along with the information required under § 61.10. If a waiver of compliance is granted, the statement is to be submitted on a date scheduled by the Administrator.

(2) In the case of a new source which did not have an initial startup date preceding the effective date, the statement is to be submitted within 90 days of the initial startup date.

(c) The statement is to contain the following information:

(1) A list of the equipment installed for compliance,

(2) A description of the physical and functional characteristics of each piece of equipment,

(3) A description of the methods which have been incorporated into the standard operating procedures for measuring or calculating the emissions for which emission limits are prescribed in §§ 61.65 (b)(1)(i) and (b)(6)(i),

(4) A statement that each piece of equipment is installed and that each piece of equipment and each procedure is being used.

§ 61.70 Semiannual report.

(a)(2) is to be determined. The number source to which this subpart applies shall submit to the Administrator on September 15 and March 15 of each year a report in writing containing the information required by this section. The first semiannual report is to be submitted following the first full 6 month reporting period after the initial report is submitted.

(b) (1) In the case of an existing source or a new source which has an initial startup date preceding the effective date, the first report is to be submitted within 180 days of the effective date, unless a waiver of compliance is granted under § 61.11. If a waiver of compliance is granted, the first report is to be submitted on a date scheduled by the Administrator.

(2) In the case of a new source which did not have an initial startup date preceding the effective date, the first report is to be submitted within 180 days of the initial startup date.

(c) Unless otherwise specified, the owner or operator shall use the Test Methods in Appendix B to this part to conduct emission tests as required by paragraphs (c)(2) and (c)(3) of this section, unless an equivalent or an alternative method has been approved by the Administrator. If the Administrator finds reasonable grounds to dispute the results obtained by an equivalent or alternative method, he may require the use of a reference method. If the results of the reference and equivalent or alternative methods do not agree, the results obtained by the reference method prevail, and the Administrator may notify the owner or operator that approval of the method previously considered to be equivalent or alternative is withdrawn.

(1) The owner or operator shall include in the report a record of any emissions which averaged over any hour period (commencing on the hour) are in excess of the emission limits prescribed in §§ 61.62(a) or (b), § 61.63(a), or §§ 61.64(a)(1), (b), (c), or (d), or for any control system to which reactor emissions are required to be ducted in § 61.64(a)(2) or to which fugitive emissions are required to be ducted in § 61.65 (b)(1)(ii), (b)(2), (b)(5), (b)(6)(ii), or (b)(9)(ii). The emissions are to be measured in accordance with § 61.68.

(2) In polyvinyl chloride plants for which a stripping operation is used to attain the emisison level prescribed in § 61.64(e), the owner or operator shall include in the report a record of the vinyl chloride content in the polyvinyl chloride resin. Test Method 107 is to be used to determine vinyl chloride content as follows:

(i) If batch stripping is used, one representative sample of polyvinyl chloride resin is to be taken from each batch of each grade of resin immediately following the completion of the stripping, and grade and the date and time the batch is completed. The corresponding quantity of material processed in each stripper batch is to be recorded and identified by resin type and grade and the date and time the batch is completed.

(ii) If continuous stripping is used, one representative sample of polyvinyl chloride resin is to be taken for each grade of resin processed or at intervals of 8 hours for each grade of resin which is being processed, whichever is more frequent. The sample is to be taken as the resin flows out of the stripper and identified by resin type and grade and the date and time the sample was taken. The corresponding quantity of material processed by each stripper over the time period represented by the sample during the eight hour period, is to be recorded and identified by resin type and grade and the date and time it represents.

(iii) The quantity of material processed by the stripper is to be determined on a dry solids basis and by a method submitted to and approved by the Administrator.

(iv) At the prior request of the Administrator, the owner or operator shall provide duplicates of the samples required in paragraphs (c)(2)(i) and (c)(2)(ii) of this section.

(v) The report to the Administrator by the owner or operator is to include the vinyl chloride content found in all the samples required in paragraphs (c)(2)(i) and (c)(2)(ii) of this section, averaged separately for each type of resin, over each calendar day and weighted according to the quantity of each grade of resin processed by the stripper(s) that calendar day, according to the following equation:

$$A_{T_j}=\frac{\sum_{i=1}^{n} P_{G_i} M_{G_i}}{Q_{T_j}}$$

$$=\frac{P_{G_1} M_{G_1}+P_{G_2} M_{G_2}+\ldots+P_{G_n} M_{G_n}}{Q_{T_j}}$$

A=24-hour average concentration of type T_j resin in ppm.
Q=Total production of type T_j resin over the 24-hour period, in kg.
T_j=Type of resin; j=1,2, . . . m where m is total number of resin types produced during the 24-hour period.
M=Concentration of vinyl chloride in one sample of grade G_i resin, in ppm.
P=Production of grade G_i resin represented by the sample, in kg.
G_i=Grade of resin, e.g., G_1, G_2, and G_3.
n=Total number of grades of resin produced during the 24-hour period.

(vi) The owner or operator shall retain at the source and make available for inspection by the Administrator for a minimum of 2 years records of all data needed to furnish the information required by paragraph (c)(2)(v) of this section: The records are to contain the following information:

(A) The vinyl chloride content found in all the samples required in paragraphs (c)(2)(i) and (c)(2)(ii) of this section, identified by the resin type and grade and the time and date of the sample, and

(B) The corresponding quantity of polyvinyl chloride resin processed by the stripper(s), identified by the resin type and grade and the time and date it represents.

(3) The owner or operator shall include in the report a record of the emissions from each reactor opening for which an emission limit is prescribed in § 61.64(a)(2). Emissions are to be determined in accordance with § 61.67(g)(5), except that emissions for each reactor are to be determined. For a reactor that is also used as a stripper, the determination may be made immediately following the stripping operation.

§ 61.71 Recordkeeping.

(a) The owner or operator of any source to which this subpart applies shall retain the following information at the source and make it available for inspection by the Administrator for a minimum of two years;

(1) A record of the leaks detected by the vinyl chloride monitoring system, as required by § 61.65(b)(8), including the concentrations of vinyl chloride as measured, analyzed, and recorded by the vinyl chloride detector, the location of each measurement and the date and approximate time of each measurement.

(2) A record of the leaks detected during routine monitoring with the portable hydrocarbon detector and the action taken to repair the leaks, as required by § 61.65(b)(8), including a brief statement explaining the location and cause of each leak detected with the portable hydrocarbon detector, the date and time of the leak and any action taken to eliminate that leak measured in accordance with § 61.68.

(3) For the relief discharges from reactors subject to the provisions of § 61.65(a), a daily operating record for each reactor, including pressures and temperatures.

2. Appendix B is amended by adding Test Methods 106 and 107 as follows:

METHOD 106—DETERMINATION OF VINYL CHLORIDE FROM STATIONARY SOURCES

INTRODUCTION

Performance of this method should not be attempted by persons unfamiliar with the operation of a gas chromatograph, nor by those who are unfamiliar with source sampling, as there are many details that are beyond the scope of this presentation. Care must be exercised to prevent exposure of sampling personnel to vinyl chloride, a carcinogen.

1. Principle and Applicability.

1.1 An integrated bag sample of stack gas containing vinyl chloride (chloroethylene) is subjected to chromatographic analysis, using a flame ionization detector.

1.2 The method is applicable to the measurement of vinyl chloride in stack gases from ethylene dichloride, vinyl chloride and polyvinyl chloride manufacturing processes, except where the vinyl chloride is contained in particulate matter.

2. Range and Sensitivity.

The lower limit of detection will vary according to the chromatograph used. Values reported include 1×10^{-7} mg and 4×10^{-7} mg.

3. Interferences.

Acetaldehyde, which can occur in some vinyl chloride sources, will interfere with the vinyl chloride peak from the Chromosorb 102 column. See sections 4.3.2 and 6.4. If resolution of the vinyl chloride peak is still not satisfactory for a particular sample, then chromatograph parameters can be further altered with prior approval of the Administrator. If alteration of the chromatograph parameters fails to resolve the vinyl chloride peak, then supplemental confirmation of the vinyl chloride peak through an absolute analytical technique, such as mass spectroscopy, must be performed.

4. Apparatus.

4.1 Sampling (Figure 1).

4.1.1 Probe—Stainless steel, Pyrex glass, or Teflon tubing according to stack temperature, each equipped with a glass wool plug to remove particulate matter.

4.1.2 Sample line—Teflon, 6.4 mm outside diameter, of sufficient length to connect probe to bag. A new unused piece is employed for each series of bag samples that constitutes an emission test.

4.1.3 Male (2) and female (2) stainless steel quick-connects, with ball checks (one pair without) located as shown in Figure 1.

4.1.4 Tedlar bags, 100 liter capacity—To contain sample. Teflon bags are not acceptable. Aluminized Mylar bags may be used, provided that the samples are analyzed within 24 hours of collection.

4.1.5 Rigid leakproof containers for 4.1.4, with covering to protect contents from sunlight.

4.1.6 Needle valve—To adjust sample flow rate.

4.1.7 Pump—Leak-free. Minimum capacity 2 liters per minute.

4.1.8 Charcoal tube—To prevent admission of vinyl chloride to atmosphere in vicinity of samplers.

4.1.9 Flow meter—For observing sample flow rate; capable of measuring a flow range from 0.10 to 1.00 liter per minute. .

4.1.10 Connecting tubing—Teflon, 6.4 mm outside diameter, to assemble sample train (Figure 1).

4.1.11 Pitot tube—Type S (or equivalent), attached to the probe so that the sampling flow rate can be regulated proportional to the stack gas velocity.

4.2 Sample recovery.

4.2.1 Tubing—Teflon, 6.4 mm outside diameter, to connect bag to gas chromatograph sample loop. A new unused piece is employed for each series of bag samples that constitutes an emission test, and is to be discarded upon conclusion of analysis of those bags.

4.3 Analysis.

4.3.1 Gas chromatograph—With flame ionization detector, potentiometric strip chart recorder and 1.0 to 5.0 ml heated sampling loop in automatic sample valve.

4.3.2 Chromatographic column—Stainless steel, 2.0 × 3.2 mm, containing 80/100 mesh Chromosorb 102. A secondary colum of GE SF-96, 20% on 60/80 mesh AW Chromosorb P, stainless steel, 2.0 m × 3.2 mm, will be required if acetaldehyde is present. If used, the SF-96 column is placed after the Chromosorb 102 column. The combined columns should then be operated at 110°C.

4.3.3 Flow meters (2)—Rotameter type, 0 to 100 ml/min capacity, with flow control valves.

4.3.4 Gas regulators—For required gas cylinders.

4.3.5 Thermometer—Accurate to one degree centigrade, to measure temperature of heated sample loop at time of sample injection.

4.3.6 Barometer—Accurate to 5 mm Hg, to measure atmospheric pressure around gas chromatograph during sample analysis.

4.3.7 Pump—Leak-free. Minimum capacity 100 ml/min.

4.4 Calibration.

4.4.1 Tubing—Teflon, 6.4 mm outside diameter, separate pieces marked for each calibration concentration.

4.4.2 Tedlar bags—Sixteen-inch square size, separate bag marked for each calibration concentration.

4.4.3 Syringe—0.5 ml, gas tight.

4.4.4 Syringe—50µl, gas tight.

4.4.5 Flow meter—Rotameter type, 0 to 1000 ml/min. range accurate to ±1%, to meter nitrogen in preparation of standard gas mixtures.

4.4.6 Stop watch—Of known accuracy, to time gas flow in preparation of standard gas mixtures.

5. Reagents. It is necessary that all reagents be of chromatographic grade.

5.1 Analysis.

5.1.1 Helium gas or nitrogen gas—Zero grade, for chromatographic carrier gas.

5.1.2 Hydrogen gas—Zero grade.

5.1.3 Oxygen gas, or Air, as required by the detector—Zero grade.

5.2 Calibration.

5.2.1 Vinyl chloride, 99.9+%—For preparation of standard gas mixtures.

5.2.2 Calibration cylinders (3), optional—One each of 50, 10 and 5 ppm vinyl chloride in nitrogen with certified analysis. Analysis must be traceable to NBS (National Bureau of Standards) or to a gravimetrically calibrated vinyl chloride permeation tube.

5.2.3 Nitrogen gas—Zero grade, for preparation of standard gas mixtures.

6. Procedure.

6.1 Sampling. Assemble the sample train as in Figure 106-1. Perform a bag leak check according to Section 7.4. Observe that all connections between the bag and the probe are tight. Place the end of the probe at the centroid of the stack and start the pump with the needle valve adjusted to yield a flow of 0.5 lpm. After a period of time sufficient to purge the line several times has elapsed, connect the vacuum line to the bag and evacuate the bag until the rotameter indicates no flow. Then reposition the sample and vacuum lines and begin the actual sampling, keeping the rate proportional to the stack velocity. Direct the gas exiting the rotameter away from sampling personnel. At the end of the sample period, shut off the pump, disconnect the sample line from the bag, and disconnect the vacuum line from the bag container. Protect the bag container from sunlight.

6.2 Sample storage. Sample bags must be kept out of direct sunlight. When at all possible, analysis is to be performed within 24 hours of sample collection.

6.3 Sample recovery. With a piece of Teflon tubing identified for that bag, connect a bag inlet valve to the gas chromatograph sample valve. Switch the valve to withdraw gas from the bag through the sample loop. Plumb the equipment so the sample gas passes from the sample valve to the leak-free pump, and then to a charcoal tube, followed by a 0–100 ml/min rotameter with flow control valve.

6.4 Analysis. Set the column temperature to 100° C the detector temperature to 150° C, and the sample loop temperature to 70° C. When optimum hydrogen and oxygen flow rates have been determined verify and maintain these flow rates during all chromatograph operations. Using zero helium or nitrogen as the carrier gas, establish a flow rate in the range consistent with the manufacturer's requirements for satisfactory detector operation. A flow rate of approximately 40 ml/min should produce adequate separations. Observe the base line periodically and determine that the noise level has stabilized and that base line drift has ceased. Purge the sample loop for thirty seconds at the rate of 100 ml/min, then activate the sample valve. Record the injection time (the position of the pen on the chart at the time of sample injection), the sample number, the sample loop temperature, the column temperature, carrier gas flow rate, chart speed and the attenuator setting. Record the laboratory pressure. From the chart, select the peak having the retention time corresponding to vinyl chloride, as determined in Section 7.2. Measure the peak area, A_m, by use of H_m, and a disc integrator or a planimeter. Measure the peak height, H_m. Record A_m and the retention time. Repeat the injection at least two times or until two consecutive vinyl chloride peaks do not vary in area more than 5%. The average value for these two areas will be used to compute the bag concentration.

Compare the ratio of H_m to A_m for the vinyl chloride sample with the same ratio for the standard peak which is closest in height. As a guideline, if these ratios differ by more than 10%, the vinyl chloride peak may not be pure (possibly acetaldehyde is present) and the secondary column should be employed (see Section 4.3.2).

6.5 Measure the ambient temperature and barometric pressure near the bag. (Assume the relative humidity to be 100 percent.) From a water saturation vapor pressure table, determine the record and water vapor content of the bag.

7. Calibration and Standards.

7.1 Preparation of vinyl chloride standard gas mixtures. Evacuate a sixteen-inch square Tedlar bag that has passed a leak check (described in Section 7.4) and meter in 5.0 liters of nitrogen. While the bag is filling, use the 0.5 ml syringe to inject 250µl of 99.9+% vinyl chloride through the wall of the bag. Upon withdrawing the syringe needle, immediately cover the resulting hole with a piece of adhesive tape. This gives a concentration of 50 ppm of vinyl chloride. In a like manner use the other syringe to prepare dilutions having 10 and 5 ppm vinyl chloride concentrations. Place each bag on a smooth surface and alternately depress opposite sides of the bag 50 times to further mix the gases.

7.2 Determination of vinyl chloride retention time. This section can be performed simultaneously with Section 7.3. Establish chromatograph conditions identical with those in Section 6.3, above. Set attenuator to X 1 position. Flush the sampling loop with zero helium or nitrogen and activate the sample valve. Record the injection time, the sample loop temperature, the column temperature, the carrier gas flow rate, the chart speed and the attenuator setting. Record peaks and detector responses that occur in the absence of vinyl chloride. Maintain conditions. With the equipment plumbing arranged identically to Section 6.3, flush the sample loop for 30 seconds at the rate of 100 ml/min with one of the vinyl chloride calibration mixtures and activate the sample valve. Record the injection time. Select the peak that corresponds to vinyl chloride. Measure the distance on the chart from the injection time to the time at which the peak maximum occurs. This quantity, divided by the chart speed, is defined as the retention time. Record.

7.3 Preparation of chromatograph calibration curve. Make a gas chromatographic measurement of each standard gas mixture (described in Section 7.1) using conditions identical with those listed in Section 6.3 above. Flush the sampling loop for 30 seconds at the rate of 100 ml/min with each standard gas mixture and activate the sample valve. Record C_c, the concentrations of vinyl chloride injected, the attenuator setting, chart speed, peak area, sample loop temperature, column temperature, carrier gas flow rate, and retention time. Record the laboratory pressure. Calculate A_c, the peak area multi-

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[1] Mention of trade names on specific products does not constitute endorsement by the Environmental Protection Agency.

plied by the attenuator setting. Repeat until two injection areas are within 5%, then plot those points vs C_c. When the other concentrations have been plotted, draw a smooth curve through the points. Perform calibration daily, or before and after each set of bag samples, whichever is more frequent.

7.4 Bag leak checks. While performance of this section is required subsequent to bag use, it is also advised that it be performed prior to bag use. After each use, make sure a bag did not develop leaks as follows. To leak check, connect a water manometer and pressurize the bag to 5–10 cm H_2O (2–4 in H_2O). Allow to stand for 10 minutes. Any displacement in the water manometer indicates a leak. Also check the rigid container for leaks in this manner.

(NOTE: An alternative leak check method is to pressurize the bag to 5–10 cm H_2O or 2–4 in. H_2O and allow to stand overnight. A deflated bag indicates a leak.) For each sample bag in its rigid container, place a rotameter in-line between the bag and the pump inlet. Evacuate the bag. Failure of the rotameter to register zero flow when the bag appears to be empty indicates a leak.

8. Calculations.

8.1 Determine the sample peak area as follows:

$$A_s = A_m A_f$$

Equation 106-1

where:

A_s = The sample peak area.
A_m = The measured peak area.
A_f = The attenuation factor.

8.2 Vinyl chloride concentrations. From the calibration curve described in Section 7.3, above, select the value of C_c that corresponds to A_s, the sample peak area. Calculate C_b as follows:

$$C_b = \frac{C_c P_r T_i}{P_i T_r (1 - B_{wb})}$$

Equation 106-2

Where:

B_{wb} = The water vapor content of the bag sample, as analyzed.
C_b = The concentration of vinyl chloride in the bag sample in ppm.
C_c = The concentration of vinyl chloride indicated by the gas chromatograph, in ppm.
P_r = The reference pressure, the laboratory pressure recorded during calibration, mm Hg.
T_i = The sample loop temperature on the absolute scale at the time of analysis, °K.
P_i = The laboratory pressure at time of analysis, mm Hg.
T_r = The reference temperature, the sample loop temperature recorded during calibration, °K.

9. References.

1. Brown, D. W., Loy, E. W. and Stephenson, M. H. "Vinyl Chloride Monitoring Near the B. F. Goodrich Chemical Company in Louisville, Kentucky." Region IV, U.S. Environmental Protection Agency, Surveillance and Analysis Division, Athens, Georgia, June 24, 1974.

2. "Evaluation of A Collection and Analytical Procedure for Vinyl Chloride in Air," by G. D. Clayton and Associates, December 13, 1974. EPA Contract No. 68-02-1408, Task Order No. 2, EPA Report oN. 75-VCL-1.

3. "Standardization of Stationary Source Emission Method for Vinyl Chloride," by Midwest Research Institute, 1976. EPA Contract No. 68-02-1098, Task Order No. 7.

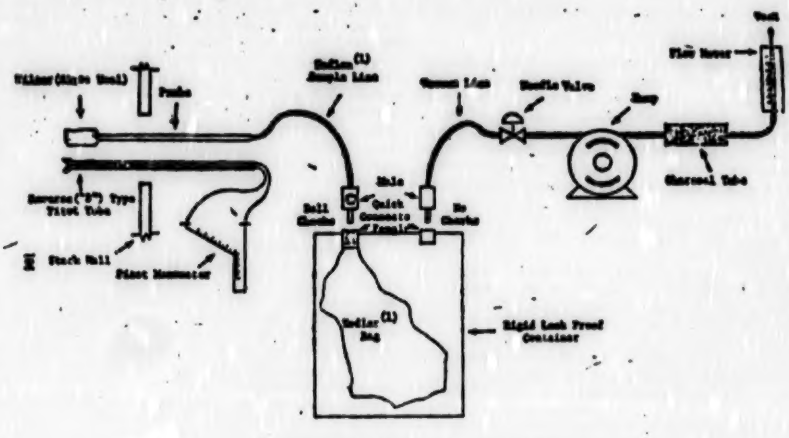

Figure 106-1. Integrated bag sampling train.

(1) Mention of trade names on specific products does not constitute endorsement by the Environmental Protection Agency.

METHOD 107—DETERMINATION OF VINYL CHLORIDE CONTENT OF INPROCESS WASTEWATER SAMPLES, AND VINYL CHLORIDE CONTENT OF POLYVINYL CHLORIDE RESIN, SLURRY, WET CAKE, AND LATEX SAMPLES

INTRODUCTION

Performance of this method should not be attempted by persons unfamiliar with the operation of a gas chromatograph, nor by those who are unfamiliar with sampling, as there are many details that are beyond the scope of this presentation. Care must be exercised to prevent exposure of sampling personnel to vinyl chloride, a carcinogen.

1. Principle and Applicability.

1.1 The basis for this method relates to the vapor equilibrium which is established between RVCM, PVC, resin, water, and air in a closed system. It has been demonstrated that the RVCM in a PVC resin will equilibrate in a closed vessel quite rapidly, provided that the temperature of the PVC resin is maintained above the glass transition temperature of that specific resin.

1.2 This procedure is suitable for determining the vinyl chloride monomer (VCM) content of inprocess wastewater samples, and the residual vinyl chloride monomer (RVCM) content of polyvinyl chloride (PVC) resins, wet cake, slurry, and latex samples. It cannot be used for polymer in fused form, such as sheet or cubes. If a resolution of the vinyl chloride peak is not satisfactory for a particular sample, then chromatograph parameters may be altered with prior approval of the Administrator. If there is reason to believe that some other hydrocarbon with an identical retention time is present in the sample, then supplemental confirmation of the vinyl chloride peak through an absolute analytical technique, such as mass spectroscopy, should be performed.

2. Range and Sensitivity.

The lower limit of detection of vinyl chloride will vary according to the chromatograph used. Values reported include 1×10^{-7} mg and 4×10^{-7} mg. With proper calibration, the upper limit may be extended as needed.

3. Precision and Reproducibility.

An interlaboratory comparison between seven laboratories of three resin samples, each split into three parts, yielded a standard deviation of 2.63% for a sample with a mean of 2.09 ppm, 4.16% for a sample with a mean of 1.66 ppm, and 5.29% for a sample with a mean of 62.66 ppm.

4. Safety.

Do not release vinyl chloride to the laboratory atmosphere during preparation of standards. Venting or purging with VCM/air mixtures must be held to a minimum. When they are required, the vapor must be routed to outside air. Vinyl chloride, even at low ppm levels, must never be vented inside the laboratory. After vials have been analyzed, the pressure within the vial must be vented prior to removal from the instrument turntable. Vials must be vented into an activated charcoal tube using a hypodermic needle to prevent release of vinyl chloride into the laboratory atmosphere. The charcoal must be replaced prior to vinyl chloride breakthrough.

5. Apparatus.

5.1 Sampling.

5.1.1 Bottles—60 ml (2 oz), with waxed lined screw on tops, for PVC samples.

5.1.2 Vials—50 ml Hypo-vials,[1] sealed with Teflon faced Tuf-Bond discs for water samples.

5.1.3 Electrical tape—or equivalent, to prevent loosening of bottle tops.

5.2 Sample recovery.

5.2.1 Vials—With seals and caps, Perkin-Elmer Corporation No. 105-0118, or equivalent.

5.2.2 Analytical balance—Capable of weighing to ±0.001 gram.

5.2.3. Syringe, 100 µl—Precision Series "A" No. 010025, or equivalent.

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[1] Mention of trade names on specific products does not constitute endorsement by the Environmental Protection Agency.

5.2.4 Vial Sealer, Perkin-Elmer No. 105-0106 or equivalent.

5.3 Analysis.

5.3.1 Gas chromatograph—Perkin-Elmer Corporation Model F-40 head-space analyser, No. 104-0001, or equivalent.

5.3.2 Chromatographic column—Stainless steel, 2 m × 3.2 mm, containing 0.4% Carbowax 1500 on Carbopak A, Perkin-Elmer Corporation No. 105-0133, or equivalent. Carbopak C can be used in place of Carbopak A.

5.3.3 Thermometer—0 to 100° C, accurate to ±0.1° C, Perkin-Elmer No. 105-0109 or equivalent.

5.3.4. Sample tray thermostat system—Perkin-Elmer No. 105-0103, or equivalent.

5.3.5 Septa—Sandwich type, for automatic dosing, 13 mm, Perkin-Elmer No. 105-1006, or equivalent.

5.3.6 Integrator - recorder — Hewlett - Packard Model 3380A, or equivalent.

5.3.7 Filter drier assembly (3)—Perkin-Elmer No. 2230117, or equivalent.

5.3.8 Soap film flowmeter—Hewlett Packard No. 0101-0113, or equivalent.

5.4 Calibration.

5.4.1 Regulators—for required gas cylinders.

6. Reagents.

6.1 Analysis.

6.1.1 Hydrogen gas—zero grade.

6.1.2 Nitrogen gas—zero grade.

6.1.3 Air—zero grade.

6.2 Calibration.

6.2.1 Standard cylinders (4)—one each of 50, 500, 2000, and 4000 ppm vinyl chloride in nitrogen, with certified analysis.

7. Procedure.

7.1 Sampling.

7.1.1 PVC sampling—Allow the resin or slurry to flow from a tap on the tank or silo until the tap line has been well purged. Extend a 60 ml sample bottle under the tap, fill, and immediately tightly cap the bottle. Wrap electrical tape around the cap and bottle to prevent the top from loosening. Place an identifying label on each bottle, and record the date, time, and sample location both on the bottles and in a log book.

7.1.2 Water sampling—Prior to use, the 50 ml vials (without the discs) must be capped with aluminum foil and muffled at 400°C for at least one hour to destroy or remove any organic matter that could interfere with analysis. At the sampling location fill the vials bubble-free, to overflowing so that a convex meniscus forms at the top. The excess water is displaced as the sealing disc is carefully placed, Teflon side down, on the opening of the vial. Place the aluminum seal over the disc and the neck of the vial and crimp into place. Affix an identifying label on the bottle, and record the date, time, and sample location both on the vials and in a log book. All samples must be kept refrigerated until analyzed.

7.2 Sample recovery. Samples must be run within 24 hours.

7.2.1 Resin samples—The weight of the resin used must be between 0.1 and 4.5 grams. An exact weight must be obtained (±0.001 gram) for each sample. In the case of suspension resins a volumetric cup can be prepared which will hold the required amount of sample. The sample bottle is opened, and the cup volume of resin is added to the tared sample vial (including septum and aluminum cap). The vial is immediately sealed and the exact sample weight is then obtained. Report this value on the data sheet as it is required for calculation of RVCM. In the case of relatively dry resin samples (water content <0.3 weight %), 100 μl of distilled water must be injected into the vial, after sealing and weighing, using a 100 μl syringe. In the case of dispersion resins, the cup cannot be used. The sample is instead weighed approximately in an aluminum dish, transferred to the tared vial and weighed accurately in the vial. The sample is then placed in the Perkin-Elmer head space analyzer (or equivalent) and conditioned for one hour at 90°C.

NOTE: Some aluminum vial caps have a center section which must be removed prior to placing into sample tray. If not removed, serious damage to the injection needle will occur.

7.2.2 Suspension resin slurry and wet cake samples—Slurry must be filtered using a small Buchner funnel with vacuum to yield wet cake. The filtering process must be continued only as long as a steady stream of water is exiting from the funnel. Excessive filtration time could result in some loss of VCM. The wet cake sample (0.10 to 4.5 grams) is added to a tared vial (including septum and aluminum cap) and immediately sealed. Sample weight is then determined to 3 decimal places. The sample is then placed in the Perkin-Elmer head space analyzer (or equivalent) and conditioned for one hour at 90°C. A sample of wet cake is used to determine TS (total solids). This is required for calculating the RVCM.

7.2.3 Dispersion resin slurry samples.—This material should not be filtered. Sample must be thoroughly mixed. Using a tared vial (including septum and aluminum cap) add approximately 8 drops (0.25 to 0.35 grams) of slurry or latex using a medicine dropper. This should be done immediately after mixing. Seal the vial as soon as possible. Determine sample weight accurate to 0.001 grams. Total sample weight must not exceed 0.50 grams. Condition the vial for one hour at 90°C in the analyzer. Determine the TS on the slurry sample (Section 7.3.5).

7.2.4 Inprocess wastewater samples—Using a tared vial (including septum and aluminum cap) quickly add approximately 1 cc of water using a medicine dropper. Seal the vial as soon as possible. Determine sample weight accurate to 0.001 gram. Condition the vial for two hours at 90°C in the analyzer.

7.3 Analysis.

7.3.1 Preparation of gas chromatograph—Install the chromatographic column and condition overnight at 150°C. Do not connect the exit end of the column to the detector while conditioning.

7.3.1.1 Flow rate adjustments—Adjust flow rates as follows:

a. Nitrogen carrier gas—Set regulator on cylinder to read 50 psig. Set regulator on chromatograph to 1.3 kg/cm^2. Normal flows at this pressure should be 25 to 40 cc/minute. Check with bubble flow meter.

b. Burner air supply—Set regulator on cylinder to read 50 psig. Set regulator on chromatograph to supply air to burner at a rate between 250 and 300 cc/minute. Check with bubble flowmeter.

c. Hydrogen supply—Set regulator on cylinder to read 30 psig. Set regulator on chromatograph to supply approximately 35±5 cc/minute. Optimize hydrogen flow to yield the most sensitive detector response without extinguishing the flame. Check flow with bubble meter and record this flow

7.3.1.2 Temperature adjustments—Set temperatures as follows:

a. Oven (chromatographic column), 50° C.

b. Dosing line, 140° C.

c. Injection block, 140° C.

d. Sample chamber, water temperature, 90° C±1.0° C.

7.3.1.3 Ignition of flame ionization detector—Ignite the detector according to the manufacturer's instructions.

7.3.1.4 Amplifier balance—Balance the amplifier according to the manufacturer's instructions.

7.3.2 Programming the chromatograph—Program the chromatograph as follows:

a. I—Dosing time—The normal setting is 2 seconds.

b. A—Analysis time—The normal setting is 8 minutes. Certain types of samples contain high boiling materials which can cause interference wtih the vinyl chloride peak on subsequent analyses. In these cases the analysis time must be adjusted to eliminate the interference. An automated backflush system can also be used to solve this problem.

c. B—Flushing—The normal setting is 0.2 minutes.

d. W—Stabilization time—The nomal setting is 0.2 minutes.

e. X—Number of analyses per sample—The normal setting is 1.

7.3.3 Preparation of sample turntable—Before placing any sample into turntable, be certain that the center section of the aluminum cap has been removed. The numbered sample bottles should be placed in the corresponding numbered positions in the turntable. Insert samples in the following order:

Positions 1 & 2—Old 2000 ppm standards for conditioning. These are necessary only after the analyzer has not been used for 24 hours or longer.

Position 3—50 ppm standard, freshly prepared.

Position 4—500 ppm standard, freshly prepared.

Position 5—2000 ppm standard, freshly prepared.

Position 6—4000 ppm standard, freshly prepared.

Position 7—Sample No. 7 (This is the first sample of the day, but is given as 7 to be consistent with the turntable and the integrator printout.)

After all samples have been positioned, insert the second set of 50, 500, 2000, and 4000 ppm standards. Samples, including standards must be conditioned in the bath of 90° C for 1 hour (not to exceed 5 hours).

7.3.4 Start chromatograph program—When all samples, including standards, have been conditioned at 90° C for 1 hour, start the analysis program according to the manufacturers' instructions. These instructions must be carefully followed when starting and stopping program to prevent damage to the dosing assembly.

7.3.5 Determination of total solids (TS).

For wet cake, slurry, resin solution, and PVC latex samples, determine TS for each sample by accurately weighing approximately 3 to 4 grams of sample in an aluminum pan before and after placing in a draft oven (105 to 110° C). Samples must be dried to constant weight. After first weighing return the pan to the oven for a short period of time and then reweigh to verify complete dryness. TS is then calculated as the final sample weight divided by initial sample weight.

8. Calibration.

Calibration is to be performed each eight-hour period when the instrument is used. Each day, prior to running samples, the column should be conditioned by running two of the previous days 2000 ppm standards.

8.1 Preparation of Standards.

Calibration standards are prepared by filling the vials with the vinyl chloride/nitrogen standards, rapidly seating the septum and sealing with the aluminum cap. Use a stainless steel line from the cylinder to the vial. Do not use rubber or tygon tubing. The sample line from the cylinder must be purged (into hood) for several minutes prior to filling vials. After purging, reduce the flow rate to approximately 500–1000 cc/min. Place end of tubing into vial (near bottom) and after one minute slowly remove tubing. Place septum in vial as soon as possible to minimize mixing air with sample. After the standard vials are sealed, inject 100μl of distilled water.

8.2 Preparation of chromatograph calibration curve.

Prepare two 50 ppm, two 500 ppm, two 2000 ppm, and two 4000 ppm standard samples. Run the calibration samples in exactly the same manner as regular samples. Plot A_s, the integrator area counts for each standard sample vs C_c, the concentration of vinyl chloride in each standard sample. Draw a line of best fit through the points.

9. Calculations.

9.1 Response factor.

From the calibration curve described in Section 8.2, above, select the value of C_c that corresponds to A_s for each sample. Compute the response factor, R_f, for each sample, as follows:

$$R_f = \frac{A_s}{C_c} \quad \text{Equation 107-1}$$

9.2 Residual vinyl chloride monomer concentration, or vinyl chloride monomer concentration.

Calculate C_{rvc} as follows:

$$C_{rvc} = \frac{A_s P_a}{R_f T_1}\left(\frac{M_v V_g}{m_s R} + K T_2\right)$$

Equation 107-2

where:

C_{rvc} = Concentration of vinyl chloride in the sample, in ppm.
P_a = Laboratory atmosphere pressure, mm Hg.
T_1 = Room temperature, °K.
M_v = Molecular weight of VCM (62.5).
V_g = Volume of vapor phase (vial volume less sample volume).
m_s = Weight of sample, grams.
R = Gas constant (62,360).
K = Henry's Law constant for VCM in PVC at 90°C, $K = 6.52 \times 10^{-6} = K_p$, for VCM in 1 cc (approximate) wastewater sample at 90°C, $K = 5.0 \times 10^{-6} = K_w$.
T_2 = Equilibration temperature, °K.

If the following conditions are met, Equation 107-2 can be simplified as follows:

1. $T_1 = 23°$ C (296° K).
2. $T_2 = 90°$ C (363° K).
3. $P_a = 760$ mm. Hg.
4. $V_g = V_v - \frac{m_s}{1.4} = 23.5 - \frac{m_s}{1.4}$

where

V_v = Vial volume, cc (23.5).

5. Sample contains less than 0.5% water.

$$C_{rvc} = \frac{A_s}{R_f}\left(4.197 \times 10^{-3} + \frac{5.988 \times 10^{-3}}{m_s}\right)$$

Equation 107-3

The following general equation can be used for any sample which contains VCM, PVC and/or water.

$$C_{rvc} = \frac{A_s P_a}{R_f T_1} \times \left[\frac{M_v V_g}{R m_s} + K_p (TS)\, T_2 + K_w (1 - TS)\, T_2\right]$$

Equation 107-4

where:

T_s = Total solids.
Note: K_w must be determined.

Results calculat[illegible]sing Equation 107–4 represent concentration based on the total sample. To obtain results based on dry PVC content, divide by TS.

For a 1 cc (approximate) wastewater sample, Equation 107–4 can be simplified to the following:

$$C_{rvc} = \frac{A_s}{R_f}\left[\frac{5.988 \times 10^{-3}}{m_s} + (2.066 \times 10^{-3})\right]$$

Equation 107-5

10. References.

1. Residual Vinyl Chloride Monomer Content of Polyvinyl Chloride Resins and Wet Cake Samples, B. F. Goodrich Chemical Co. Standard Test Procedure No. 1005–T. B. F. Goodrich Technical Center, Avon Lake, Ohio. January 30, 1975.

2. Berens, A. R., "The Solubility of Vinyl Chloride in Polyvinyl Chloride," ACS-Division of Polymer Chemistry, Polymer Preprints *15* (2): 197, 1974.

3. Berens, A. R., "The Diffusion of Vinyl Chloride in Polyvinyl Chloride," ACS-Division of Polymer Chemistry, Polymer Preprints *15* (2): 203, 1974.

4. Berens, A. R., L. B. Crider, C. J. Tomanek and J. M. Whitney, Analysis for Vinyl Chloride in PVC Powders by Head-Space Gas Chromatography," to be published.

[FR Doc.76-30849 Filed 10-20-76;8:45 am]

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PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Delegation of Authority to State of California on Behalf of Santa Barbara County Air Pollution Control District

Pursuant to the delegation of authority for national emission standards for hazardous air pollutants (NESHAPS) to the State of California on behalf of the Santa Barbara County Air Pollution Control District, dated September 17, 1976, EPA is today amending 40 CFR 61.04, Address, to reflect this delegation. A Notice announcing this delegation is published in the Notices section of this issue of the FEDERAL REGISTER. The amended § 61.04 is set forth below. It adds the address of the Santa Barbara County Air Pollution Control District to which must be addressed all reports, requests, applications, submittals, and communications pursuant to this part by sources subject to the NESHAPS located within Air Pollution Control District.

The Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegation which is reflected by this administrative amendment was effective on September 17, 1976 and it serves no purpose to delay the technical change of this addition of the Air Pollution Control District's address to the Code of Federal Regulations.

This rulemaking is effective immediately, and is issued under the authority of section 112 of the Clean Air Act, as amended (42 U.S.C. 1857c–7).

Dated: October 20, 1976.

PAUL DE FALCO, Jr.,
Regional Administrator,
EPA, Region IX.

Part 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

1. In § 61.04 paragraph (b)(3) is amended by revising subparagraph F to read as follows:

§ 61.04 Address.

* * * * *

(b) * * *
(3) * * *
(A)–(E) * * *

F—CALIFORNIA

Bay Area Air Pollution Control District, 939 Ellis St., San Francisco, CA 94109.

Del Norte County Air Pollution Control District, Courthouse, Crescent City, CA 95531.

Fresno County Air Pollution Control District, 515 S. Cedar Avenue, Fresno, CA 93702.

Humboldt County Air Pollution Control District, 5600 S. Broadway, Eureka, CA 95501.

Kern County Air Pollution Control District, 1700 Flower St., (P.O. Box 997), Bakersfield, CA 93302.

Madera County Air Pollution Control District, 135 W. Yosemite Avenue, Madera, CA 93637.

Mendocino County Air Pollution Control District, County Courthouse, Ukiah, CA 95482.

Monterey Bay Unified Air Pollution Control District, 420 Church St. (P.O. Box 487), Salinas, CA 93901.

Northern Sonoma County Air Pollution Control District, 3313 Chanate Rd., Santa Rosa, CA 95404.

Sacramento County Air Pollution Control District, 3701 Branch Center Road, Sacramento, CA 95827.

San Joaquin County Air Pollution Control District, 1601 E. Hazelton St. (P.O. Box 2009), Stockton, CA 95201.

Santa Barbara Air Pollution Control District, 4440 Calle Real, Santa Barbara, CA 93110.

Stanislaus County Air Pollution Control District, 820 Scenic Drive, Modesto, CA 95350.

Trinity County Air Pollution Control District, Box AJ, Weaverville, CA 96093.

Ventura County Air Pollution Control District, 625 E. Santa Clara St., Ventura, CA 93001.

[FR Doc.76–32105 Filed 11-2-76;8:45 am]

30

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Delegation of Authority to Pima County Health Department on Behalf of Pima County Air Pollution Control District

Pursuant to the delegation of authority for national emission standards for hazardous air pollutants (NESHAPS) to the Pima County Health Department on behalf of the Pima County Air Pollution Control District, dated October 7, 1976, EPA is today amending 40 CFR 61.04, Address, to reflect this delegation. A document announcing this delegation is published today at 41 FR in the Notices section of this issue. The amended § 61.04 is set forth below. It adds the address of the Pima County AirPollution Control District to which must be addressed all reports, requests, applications, submittals, and communications pursuant to this part by sources subject to the NESHAPS located within the Air Pollution Control District.

The Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegation which is reflected by this administrative amendment was effective on October 7, 1976 and it serves no purpose to delay the technical change of this addition of the Air Pollution Control District's address to the Code of Federal Regulations.

This rulemaking is effective immediately, and is issued under the authority of Section 112 of the Clean Air Act, as amended (42 U.S.C. 1857c–7).

Dated: November 19, 1976.

R. L. O'CONNELL,
Acting Regional Administrator Environmental Protection Agency, Region IX.

Part 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

1. In § 61.04 paragraph (b) is amended by adding subparagraph D to read as follows:

§ 61.04 Address.

* * * * *

(3) * * *
(A)–(C) * * *
D—Arizona

Pima County Air Pollution Control District, 151 West Congress Street, Tucson AZ 85701.

* * * * *

[FR Doc.76-35563 Filed 12-2-76;8:45 am]

[FRL 616-1]

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Standard for Vinyl Chloride

Correction

In FR Doc. 76–30849 appearing at page 46560 in the FEDERAL REGISTER of Thursday, October 21, 1976 the following corrections should be made:

1. On page 46564, middle column, the amendatory language in the sixth paragraph, sixth and seventh line is corrected to read "amended by revising the authority and adding a new Subpart F reading as follows".

2. On page 46567, in the first column, in § 61.65(b)(9)(i), fifteenth line, the fourth word "The" should read "This".

3. On page 46567, middle column, second line from the top in § 61.65(c) should read "(1.250 gal) in volume for which an emis-".

4. (a) On page 46568, middle column, in § 61.68(a), eighth line, first word should read "emissions".

(b) On page 46568, middle column, in § 61.68(a) between the eighth and ninth lines insert the following "§61.64(a)(2) or to which fugitive emissions are required to be ducted in".

(c) On page 46568, third column, in § 61.68(c), the thirteenth to sixteenth lines should read: "chloride which is determined to be equivalent to the emission limit for that source based on the emission test required by § 61.67. The".

5. On page 46568, third column, in § 61.70 the first line should read "(a) The owner or operator of any".

6. (a) On page 46570, first column, in Appendix B, Method 106, paragraph 4.3.2, second line should read "steel, 2.0 m X * * *"

(b) On page 46570, third column in Appendix B, Method 106, paragraph 6.4, sixth and seventh lines should read "of a disc integrator or a planimeter. Measure the peak height, H_m Record A_m, H_m, and"

(c) On page 46570, third column, in Appendix B, Method 106, paragraph 6.5, the fifth line should read "determine and record the water vapor con-".

7. On page 46573, top of second column, in Appendix B, Method 107, paragraph 9.2, figure 4, the last figure in the equation should read

$$\frac{\text{“}m_i\text{”}}{1.4}.$$

FEDERAL REGISTER, VOL. 41, NO. 234

FRIDAY, DECEMBER 3, 1976

31

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Delegation of Authority to State of California on Behalf of San Diego County Air Pollution Control District

Pursuant to the delegation of authority for national emission standards for hazardous air pollutants (NESHAPS) to the State of California on behalf of the San Diego County Air Pollution Control District, dated November 8, 1976, EPA is today amending 40 CFR 61.04, Address, to reflect this delegation. A Notice announcing this delegation is published in the Notices section of this issue, under EPA (FR Doc. 76–36929). The amended § 61.04 is set forth below. It adds the address of the San Diego County Air Pollution Control District to which must be addressed all reports, requests, applications, submittals, and communications pursuant to this part by sources subject to the NESHAPS located within Air Pollution Control District.

The Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegation which is reflected by this administrative amendment was effective on November 8, 1976 and it serves no purpose to delay the technical change of this addition of the Air Pollution Control District's address to the Code of Federal Regulations.

This rulemaking is effective immediately, and is issued under the authority of section 112 of the Clean Air Act, as amended (42 U.S.C. 1857c–7).

Dated: November 26, 1976.

SHEILA M. PRINDIRVILLE,
Acting Regional Administrator, Environmental Protection Agency, Region IX.

Part 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

1. In § 61.04 paragraph (b) is amended by revising subparagraph F to read as follows:

§ 61.04 Address.

* * * * *

(b) * * *

(A)–(E) * * *

F–California:

Bay Area Air Pollution Control District, [illegible] Ellis Street, San Francisco, CA 94109.

Del Norte County Air Pollution Control District, Courthouse, Crescent City, CA 95531.

Fresno County Air Pollution Control District, 515 S. Cedar Avenue, Fresno, CA 93702.

Humboldt County Air Pollution Control District, 5600 S. Broadway, Eureka, CA 95501.

Kern County Air Pollution Control District, 1700 Flower Street (P.O. Box 997) Bakersfield, CA 93302.

Madera County Air Pollution Control District, 135 W. Yosemite Avenue, Madera, CA 93637.

Mendocino County Air Pollution Control District, County Courthouse, Ukiah, CA 95482.

Monterey Bay Unified Air Pollution Control District, 420 Church Street (P.O. Box 487), Salinas, CA 93901.

Northern Sonoma County Air Pollution Control District, 3313 Chanate Road, Santa Rosa, CA 95404.

Sacramento County Air Pollution Control District, 3701 Branch Center Road, Sacramento, CA 95827.

San Diego County Air Pollution Control District, 9150 Chesapeake Drive, San Diego, CA 92123.

San Joaquin County Air Pollution Control District, 1601 E. Hazelton Street (P.O. Box 2009), Stockton, CA 95201.

Santa Barbara Air Pollution Control District, 4440 Calle Real, Santa Barbara, CA 93110.

Stanislaus County Air Pollution Control District, 820 Scenic Drive, Modesto, CA 95350.

Trinity County Air Pollution Control District, Box AJ, Weaverville, CA 96093.

Ventura County Air Pollution Control District, 625 E. Santa Clara Street, Ventura, CA 93001.

* * * * *

[FR Doc.76–36928 Filed 12–14–76;8:45 am]

FEDERAL REGISTER, VOL. 41, NO. 242

WEDNESDAY, DECEMBER 15, 1976

32

SUBCHAPTER C—AIR PROGRAMS

DELEGATION OF AUTHORITY—NEW SOURCE REVIEW

Delegation of Authority to the State of North Carolina

The amendments below institute certain address changes for reports and applications required from operators of new sources. EPA has delegated to the State of North Carolina authority to review new and modified sources. The delegated authority includes the reviews under 40 CFR Part 52 for the prevention of significant deterioration. It also includes the reviews under 40 CFR Part 60 for the standards of performance for new stationary sources and reviews under 40 CFR Part 61 for national emission standards for hazardous air pollutants.

A notice announcing the delegation of authority is published elsewhere in this issue of the FEDERAL REGISTER. These amendments provide that all reports, requests, applications, submittals, and communications previously required for the delegated reviews will now be sent instead to the North Carolina Environmental Management Commission, Department of Natural and Economic Resources, Division of Environmental Management, P.O. Box 27687, Raleigh, North Carolina 27611. Attention: Air Quality Section, instead of EPA's Region IV.

The Regional Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegation which is reflected by this administrative amendment was effective on November 24, 1976, and it serves no purpose to delay the technical change of this addition of the State address to the Code of Federal regulations.

This rulemaking is effective immediately, and is issued under the authority of Sections 101, 110, 111, 112, and 301 of the Clean Air Act, as amended, 42 U.S.C. 1857, 1857c–5, 6, 7 and 1857g.

Dated: December 21, 1976.

JOHN A. LITTLE,
Deputy Regional Administrator.

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

3. Part 61 of Chapter I, Title 40, Code of Federal Regulations, is amended as follows: In § 61.04, paragraph (b) is amended by revising subparagraph (II) to read as follows:

§ 61.04 Address.

* * * * *

(b) * * *

(A)–(HH) * * *

(II) North Carolina Environmental Management Commission, Department of Natural and Economic Resources, Division of Environmental Management, P.O. Box 27687, Raleigh, North Carolina 27611. Attention: Air Quality Section.

* * * * *

[FR Doc 76–38387 Filed 12–29–76;8:45 am]

FEDERAL REGISTER, VOL. 41, NO. 252

THURSDAY, DECEMBER 30, 1976

33

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Delegation of Authority to State of Vermont

Pursuant to the delegation of authority for National Emission Standards for Hazardous Air Pollutants (NESHAPS) to the State of Vermont on September 3, 1976, EPA is today amending 40 CFR 61.04, *Address*, to reflect this delegation. A Notice announcing this delegation is published today in the FEDERAL REGISTER (see FR Doc. 77-546 appearing in the notices section of this issue). The amended § 61.04, which adds the address of the Vermont Agency of Environmental Protection to which all reports, requests, applications, submittals, and communications to the Administrator pursuant to this part must also be addressed, is set forth below.

The Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegation which is reflected by this administrative amendment was effective on September 3, 1976, and it serves no purpose to delay the technical change of this addition of the State address to the Code of Federal Regulations.

This rulemaking is effective immediately, and is issued under the authority of Section 112 of the Clean Air Act, as amended, 42 U.S.C. 1847c–7.

Dated: December 17, 1976.

JOHN A. S. MCGLENNON,
Regional Administrator.

Part 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

In § 61.04 paragraph (b) is amended by revising subparagraph (UU) to read as follows:

§ 61.04 Address.

* * * * *

(b) * * *

(UU)—State of Vermont, Agency of Environmental Protection, Box 489, Montpelier, Vermont 05602.

* * * * *

[FR Doc.77-546 Filed 1-5-77;8:45 am]

FEDERAL REGISTER, VOL. 42, NO. 4

THURSDAY, JANUARY 6, 1977

34

Title 40—Protection of Environment

CHAPTER I—ENVIRONMENTAL PROTECTION AGENCY

SUBCHAPTER C—AIR PROGRAMS

[FRL 673-6]

NEW SOURCE REVIEW

Delegation of Authority to the State of South Carolina

The amendments below institute certain address changes for reports and applications required from operators of new sources. EPA has delegated to the State of South Carolina authority to review new and modified sources. The delegated authority includes the reviews under 40 CFR Part 52 for the prevention of significant deterioration. It also includes the review under 40 CFR Part 60 for the standards of performance for new stationary sources and review under 40 CFR Part 61 for national emission standards for hazardous air pollutants.

A notice announcing the delegation of authority is published elsewhere in the notices section of this issue of the FEDERAL REGISTER. These amendments provide that all reports, requests, applications, submittals, and communications previously required for the delegated reviews will now be sent to the Office of Environmental Quality Control, Departpartment of Health and Environmental Control, 2600 Bull Street, Columbia, South Carolina 29201, instead of EPA's Region IV.

The Regional Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No auditional substantive burdens are imposed on the parties affected. The delegation which is reflected by this administrative amendment was effective on October 19, and it serves no purpose to delay the technical change of this addition of the State address to the Code of Federal Regulations.

This rulemaking is effective immediately, and is issued under the authority of sections 101, 110, 111, 112, and 301 of the Clean Air Act, as amended, 42 U.S.C. 1857c–5, 6, 7 and 1857g.

Dated: January 11, 1977.

JOHN A. LITTLE,
Acting Regional Administrator.

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

DELEGATION OF AUTHORITY TO THE STATE OF SOUTH CAROLINA

3. Part 61 of Chapter I, Title 40, Code of Federal Regulations, is amended by revising subparagraph (PP) of § 61.04(b) to read as follows:

§ 61.04 Address.

* * * * *

(b) * * *

(A)-(OO) * * *

(PP) State of South Carolina, Office of Environmental Quality Control, Department of Health and Environmental Control, 2600 Bull Street, Columbia, South Carolina 29201.

* * * * *

[FR Doc.77-1969 Filed 1-21-77;8:45 am]

FEDERAL REGISTER, VOL. 42, NO. 15

MONDAY, JANUARY 24, 1977

35

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Delegation of Authority to City of Philadelphia

Pursuant to the delegation of authority for national emission standards for hazardous air pollutants (NESHAPS) to the City of Philadelphia on September 30, 1976, EPA is today amending 40 CFR 61.04, Address, to reflect this delegation. For a Notice announcing this delegation, see FR Doc. 77-3712 published in the Notices section of today's FEDERAL REGISTER. The amended § 61.04, which adds the address of the Philadelphia Department of Public Health, Air Management Services, to which all reports, requests, applications, submittals, and communications to the Administrator pursuant to this part must also be addressed, is set forth below.

The Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegation which is reflected by this Administrative amendment was effective on September 30, 1976, and it serves no purpose to delay the technical change of this address to the Code of Federal Regulations.

This rulemaking is effective immediately, and is issued under the authority of section 112 of the Clean Air Act, as amended, 42 U.S.C. 1857c–7.

Dated: January 25, 1977.

A. R. MORRIS,
Acting Regional Administrator.

Part 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

1. In § 61.04, paragraph (b) is amended by revising Subparagraph (NN) to read as follows:

§ 61.04 Address.

* * * * *

(b) * * *

(A)-(MM) * * *

(NN)(b) City of Philadelphia.
Philadelphia Department of Public Health.
Air Management Services,
801 Arch Street,
Philadelphia, Pennsylvania 19107.

[FR Doc.77-3711 Filed 2-3-77;8:45 am]

[FRL 682-6]

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Delegation of Authority to Commonwealth of Pennsylvania

Pursuant to the delegation of authority for National Emission Standards for Hazardous Air Pollutants (NESHAPS) to the Commonwealth of Pennsylvania on September 30, 1976, EPA is today amending 40 CFR 61.04, Address, to reflect this delegation. For a Notice announcing this delegation, see FR Doc 77-3713 published in the Notices section of today's FEDERAL REGISTER. The amended § 61.04, which adds the address of the Pennsylvania Department of Environmental Resources, Bureau of Air Quality and Noise Control, to which all reports, requests, applications, submittals, and communications to the Administrator pursuant to this part must also be addressed, is set forth below.

The Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegation which is reflected by this Administrative amendment was effective on September 30, 1976, and it serves no purpose to delay the technical change of this address to the Code of Federal Regulations.

This rulemaking is effective immediately, and is issued under the authority of section 112 of the Clean Air Act, as amended, 42 U.S.C. 1857c-7.

Dated: January 25, 1977.

A. R. MORRIS,
Acting Regional Administrator.

Part 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

1. In § 61.04, paragraph (b) is amended by revising Subparagraph (NN) to read as follows:

§ 61.04 Address.

* * * * *

(b) * * *

(A)-(MM) * * *

(NN)(a) Commonwealth of Pennsylvania (except for City of Philadelphia and Allegheny County)

Pennsylvania Department of Environmental Resources,
Bureau of Air Quality and Noise Control,
Post Office Box 2063,
Harrisburg, Pennsylvania 17120.

[FR Doc.77-3710 Filed 2-3-77;8:45 am]

FEDERAL REGISTER, VOL. 42, NO. 24
FRIDAY, FEBRUARY 4, 1977

36

Title 40—Protection of Environment

CHAPTER I—ENVIRONMENTAL PROTECTION AGENCY

[FRL 694-4]

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Amendment to Asbestos Standard

● *Purpose.* The purpose of this amendment is to clarify that the demolition and renovation provisions of the asbestos standard apply when friable asbestos materials used for insulation and fireproofing are removed from non-load-supporting structural members, such as non-supporting walls and ceilings, as well as from load-supporting structural members. ●

Under section 112 of the Clean Air Act, as amended, 42 U.S.C. 1857c-7, (the "Act"), the Administrator of the Environmental Protection Agency promulgated the national emission standard for the hazardous air pollutant asbestos on April 6, 1973 (38 FR 8820). Amendments to this standard were promulgated on May 3, 1974 (39 FR 15396) and on October 14, 1975 (40 FR 48292). The standard does not include a definition for the term "structural member", and questions have arisen concerning what constitutes a structural member. The definition of "structural member" is therefore being added to 40 CFR 61.21 to clarify that the standard applies to both load-supporting and non-load-supporting structural members. The latter category includes such items as ceilings and non-load-supporting walls.

The preamble to the proposed amendments (39 FR 38064, October 25, 1974) that were promulgated on October 14, 1975, clearly stated that EPA intended to cover non-load-supporting structural members. No contrary intent was expressed at the time of final promulgation. The amendment promulgated below clarifies EPA's intent and should answer future questions on the applicability of the standard.

The Administrator finds that a prepromulgation public comment period on this amendment would be "impracticable, unnecessary, or contrary to the public interest" within the meaning of 5 U.S.C. 553(b)(B) because the rulemaking clarifies and interprets an existing regulation, does not alter the intended content of that regulation, and enables EPA to enforce the existing standard in a consistent and proper manner. Also, the Administrator finds that this rulemaking should be effective upon promulgation without a 30-day deferral within the meaning of 5 U.S.C. 553(d), because of the immediate effectiveness required by section 112(b)(1)(C) of the Act and the interpretive nature of this rulemaking.

Other questions have been raised recently about the applicability of the asbestos standard to decorative coatings. The words of the current standard do not apply to such coatings. EPA is proposing amendments to the asbestos standard elsewhere in this issue of the FEDERAL REGISTER to regulate such coatings.

(Sec. 112, Clean Air Act as aded by sec. 4(a) of Pub. L. 91-604, 84 Stat. 1685 (42 U.S.C. 1857c-7); sec. 114, Clean Air Act, as added by sec. 4(a) of Pub. L. 91-604, 84 Stat. 1687, and amended by Pub. L. 93-319, sec. 6(a)(4), 88 Stat. 259 (42 U.S.C. 1857c-9); sec. 301(a), Clean Air Act, as amended by sec. 15(c)(2) of Pub. L. 91-604, 84 Stat. 1713 (42 U.S.C. 1857g(a)).)

Dated: February 23, 1977.

JOHN QUARLES,
Acting Administrator.

In Part 61 of Chapter I, Title 40 of the Code of Federal Regulations, § 61.21 is amended by adding paragraph (x) as follows:

Subpart B—National Emission Standard for Asbestos

§ 61.21 Definitions.

* * * * *

(x) "Structural member" means any load-supporting member, such as beams and load-supporting walls; or any non-load-supporting member, such as ceilings and non-load-supporting walls.

[FR Doc.77-6061 Filed 3-1-77;8:45 am]

FEDERAL REGISTER, VOL. 42, NO. 41
WEDNESDAY, MARCH 2, 1977

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Region V Address; Correction

Section 61.04 paragraph (a) is corrected by changing Region V (Illinois, Indiana, Minnesota, Michigan, Ohio, Wisconsin), 1 North Wacker Drive, Chicago, Illinois 60606 to Region V (Illinois, Indiana, Minnesota, Michigan, Ohio, Wisconsin), 230 South Dearborn Street, Chicago, Illinois 60604.

Dated: March 21, 1977.

GEORGE R. ALEXANDER,
Regional Administrator.

[FR Doc.77-8607 Filed 3-29-77;8:45 am]

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Delegation of Authority to the State of Wisconsin

Pursuant to the delegation of authority for national emission standards for hazardous air pollutants (NESHAPS) to the State of Wisconsin on September 28, 1976, EPA is today amending 40 CFR 61.04, Address, to reflect this delegation. A Notice announcing this delegation is published today March 30, 1977, at 42 FR 16845 in this FEDERAL REGISTER. The amended Section 61.04, which adds the address of the Wisconsin Department of Natural Resources to which all reports, requests, applications, submittals, and communications to the Administrator pursuant to this part must also be addressed, is set forth below.

The Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegation which is reflected by this administrative amendment was effective on September 28, 1976, and it serves no purpose to delay the technical change of this addition of the State address to the Code of Federal Regulations.

This rulemaking is effective immediately, and is issued under the authority of section 112 of the Clean Air Act, as amended, 42 U.S.C. 1857c-7.

Dated: March 21, 1977.

GEORGE R. ALEXANDER, Jr.,
Regional Administrator.

Part 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

1. In § 61.04 paragraph (b) is amended by revising subparagraph (YY) to read as follows:

§ 61.04 Address.

* * * * *

(b) * * *

(A)-(XX) * * *

(YY) Wisconsin—

Wisconsin Department of Natural Resources,
P.O. Box 7921, Madison, Wisconsin 53707.

[FR Doc.77-8608 Filed 3-29-77;8:45 am]

SECTION IV

PROPOSED AMENDMENTS

ENVIRONMENTAL PROTECTION AGENCY

■

ASBESTOS

Hazardous Air Pollutants Proposed National Emission Standards

SUBPART B

ENVIRONMENTAL PROTECTION AGENCY

[40 CFR Part 61]

[FRL 684-6]

NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Proposed Amendments to Asbestos Standard

Notice is hereby given that under the authority of section 112 of the Clean Air Act, as amended, the Administrator is proposing to amend the national emission standard for asbestos.

SUMMARY OF PROPOSED AMENDMENTS

The proposed amendments would extend coverage of the demolition and renovation provisions (40 CFR 61.22(d)) to all materials which are friable and contain more than one percent asbestos by weight. The current provisions apply only to insulation and fireproofing materials. The proposed amendments similarly would extend the coverage of the asbestos spraying provisions (40 CFR 61.22(e)) by prohibiting all materials sprayed on buildings, structures, structural members, pipes and conduits which contain more than one percent asbestos by weight. The proposed amendments specify that materials sprayed on structural members are covered.

DISCUSSION

On April 6, 1973, under Section 112 of the Clean Air Act, as amended, the Administrator promulgated the national emission standard for asbestos. Amendments to this standard were promulgated on May 3, 1974 (39 FR 15396) and on October 14, 1975 (40 FR 48292). One of the provisions of the standard limits asbestos emissions from the spraying of materials to insulate or fireproof buildings, structures, pipes and conduits. The standard prohibits the use of such materials which contain more than one percent asbestos on a dry weight basis. At the time the standard was promulgated, EPA did not know of uses other than fireproofing and insulation for asbestos-containing spray-on materials that were major sources of asbestos emissions during application or later removal through renovation or demolition. Recently it has come to EPA's attention that certain types of decorative spray-on materials which contain from 29 to 64 percent asbestos by weight have been sprayed on ceilings in residential buildings and may be applied in the same manner in the future. These materials are sometimes friable and therefore would be a major source of asbestos emissions during renovation and demolition operations. The use of such spray-on materials is considered a major source of asbestos emissions because: (1) There are asbestos emissions resulting from over-spray during the spray-on application of such materials which could be emitted to the atmosphere directly and cause exposure to the general public; (2) this over-spray material could contaminate the building ventilation air and therefore pose a health hazard to persons who breathe it; (3) the spray-on materials may deteriorate with time and thereby contaminate the ventilation air when they fall off points of application; and (4) if the materials become friable after application, they would cause asbestos emissions to the atmosphere when the building or structure is renovated or demolished.

For these reasons EPA is proposing to prohibit the spraying of all materials which contain asbestos in excess of one percent by weight on buildings, structures, structural members, pipes, and conduits. This prohibition includes spray-on application of paints, decorative sprays, and weatherproofing.

An amendment is also being proposed which would extend the coverage of the demolition and renovation provisions to include the proper removal of all friable materials which contain in excess of one percent asbestos prior to renovation or demolition of buildings, structures, facilities, or installations. Currently, the standard applies only to the removal of fireproofing or insulation which is friable and contains greater than one percent asbestos. Proper removal of such materials is considered necessary to reduce asbestos emission during renovation and demolition operations to a minimum.

EPA feels that it is urgent that the persons or firms who still apply or manufacture asbestos-containing spray-on materials be advised as early as possible of EPA's intent to regulate such application and of the potential hazard associated with the use of such products. In order to fully investigate all aspects and possible impacts of the proposed amendments, EPA is requesting that all interested persons submit factual information related to the proposed requirements during the comment period. Factual information is specifically requested on the following areas of interest:

1. Information about spray-on materials which contain greater than one percent asbestos by weight; asbestos substitutes for use in spray-on materials; the availability of spray-on materials which contain less than one percent asbestos; and technical and economic impacts which could result from implementing the proposed amendments.

2. Information concerning the magnitude of potential emissions of asbestos during spray application of asbestos-containing materials, methods of reducing emissions of asbestos during application; and the friability of spray-on materials after they have been applied.

3. Information on the renovation or demolition of buildings, structures, facilities, or installations which contain friable asbestos materials (containing greater than one percent asbestos); and methods of removal and wetting of the friable asbestos materials.

It is expected that the requested information will allow EPA to assess the economic effects and technical aspects of the proposed requirements. The final amendments will reflect the conclusions drawn from evaluation of all available factual information. EPA will limit the scope of coverage of the final amendments if the data obtained during the comment period justify such a change.

The proposed amendments are as follows:

1. The definitions of the terms "renovation," "removing," and "stripping" would be changed by deleting the phrases "to insulate or fireproof" and "for insulation or fireproofing." This would broaden the applicability of the terms to cover all friable asbestos materials.

2. The paragraphs under the demolition and renovation provisions would be changed by deleting the phrases "insulated or fireproofed," "insulate or fireproof," "insulation and fireproofing," "insulation or fireproofing," and the word "insulate." This would broaden the applicability of the provisions to cover all friable asbestos materials.

3. The spraying provision would be changed by deleting the phrase "to insulate or fireproof." This would broaden the applicability of the spraying regulation to cover the spraying of all asbestos-containing materials.

PUBLIC PARTICIPATION

Interested persons may participate in this rulemaking by submitting written comments (in triplicate) to the Emission Standards and Engineering Division, Environmental Protection Agency, Research Triangle Park, North Carolina 27711, Attention: Mr. Don R. Goodwin. The Administrator will welcome comments on all aspects of the proposed amendments. All relevant comments received on or before May 2, 1977, will be considered. Comments received will be available for public inspection and copying at the EPA Public Information Reference Unit, Room 2922 (EPA Library), 401 M Street, SW., Washington, D.C. 20460.

OTHER ACTION

Elsewhere in this issue of the FEDERAL REGISTER, EPA is issuing a final rulemaking action which clarifies that the renovation and demolition provisions of the asbestos standard apply to materials which contain greater than one percent asbestos, are friable, and were used for fireproofing or insulation on non-load-supporting structural members, such as some ceilings and walls, as well as on load-supporting structural members. This amendment consists of adding a definition for the term "structural member."

(Sec. 112, Clean Air Act as added by sec. 4(a) of Pub. L. 91-604, 84 Stat. 1685 (42 U.S.C. 1857c-7); sec. 114, Clean Air Act, as added by sec. 4(a) of Pub. L. 91-604, 84 Stat. 1687, and amended by Pub. L. 93-319, sec. 6(a)(4), 88 Stat. 259 (42 U.S.C. 1857c-9); sec. 301(a), Clean Air Act, as amended by sec. 15(c)(2) of Pub. L. 91-604, 84 Stat. 1713 (42 U.S.C. 1857g(a)).)

Dated: February 23, 1977.

JOHN QUARLES,
Acting Administrator.

It is proposed to amend Part 61 of Chapter I, Title 40 of the Code of Federal Regulations as follows:

Subpart B—National Emission Standard for Asbestos

1. Section 61.21 is amended by revising paragraphs (m), (q) and (r) to read as follows:

§ 61.21 Definitions.

*   *   *   *   *

(m) "Renovation" means the removing or stripping of friable asbestos materials used on any pipe, duct, boiler, tank, reactor, turbine, furnace, or structural member. Operations in which load-supporting structural members are wrecked or taken out are excluded.

*   *   *   *   *

(q) "Removing" means taking out friable asbestos materials used on any pipe, duct, boiler, tank, reactor, turbine, furnace, or structural member from any building, structure, facility, or installation.

(r) "Stripping" means taking off friable asbestos materials from any pipe, duct, boiler, tank, reactor, turbine, furnace, or structural member.

*   *   *   *   *

2. Section 61.22 is amended by revising paragraphs (d), (d)(1)(i), (d)(1)(ii), (d)(2)(iii), (d)(4)(i), (d)(4)(ii), (d)(4)(iii), (d)(4)(iv), (e), and (e)(2) to read as follows:

§ 61.22 Emission standard.

*   *   *   *   *

(d) *Demolition and renovation.* The requirements of this paragraph shall apply to any owner or operator of a demolition or renovation operation who intends to demolish any institutional, commercial, or industrial building (including apartment buildings having more than four dwelling units), structure, facility, installation, or portion thereof which contains any pipe, duct, boiler, tank, reactor, turbine, furnace, or structural member that is covered or coated with friable asbestos materials, except as provided in paragraph (d)(1) of this section; or who intends to renovate any institutional, commercial, or industrial building, structure, facility, installation, or portion thereof where more than 80 meters (ca 260 feet) of pipe covered or coated with friable asbestos materials are stripped or removed, or more than 15 square meters (ca. 160 square feet) of friable asbestos materials used to cover or coat any duct, boiler, tank, reactor, turbine, furnace, or structural member are stripped or removed.

(i) (A) The owner or operator of a demolition operation is exempted from the requirements of this paragraph: *Provided*, (a) The amount of friable asbestos materials in the building or portion thereof to be demolished is less than 80 meters (ca. 260 feet) used on pipes, and less than 15 square meters (ca. 160 square feet) used on any duct, boiler, tank, reactor, turbine, furnace, or structural member, and (B) the notification requirements of paragraph (d)(1)(ii) are met.

(ii) Written notification shall be postmarked or delivered to the Administrator at least 20 days prior to commencement of demolition and shall include the information required by paragraph (d)(2) of this section, with the exception of the information required by paragraphs (d)(2) (iii), (vi), (vii), (viii), and (ix) of this section, and shall state the measured or estimated amount of friable asbestos materials which is present. Techniques of estimation shall be explained.

(2) * * *

(iii) Description of the building, structure, facility, or installation to be demolished or renovated, including the size, age, and prior use of the structure, and the approximate amount of friable asbestos materials used.

*   *   *   *   *

(4) * * *

(i) Friable asbestos materials, used on any pipe, duct, boiler, tank, reactor, turbine, furnace, or structural member, shall be removed from any building, structure, facility or installation subject to this paragraph. Such removal shall occur before wrecking or dismantling of any portion of such building, structure, facility, or installation that would break up the friable asbestos materials and before wrecking or dismantling of any other portion of such building, structure, facility, or installation, that would preclude access to such materials for subsequent removal. Removal of friable asbestos materials used on any pipe, duct, or structural member which are encased in concrete or other similar structural material is not required prior to demolition, but such materials shall be adequately wetted whenever exposed during demolition.

(ii) Friable asbestos materials used on pipes, ducts, boilers, tanks, reactors, turbines, furnaces, or structural members shall be adequately wetted during stripping, except as provided in paragraphs (d)(4)(iv), (d)(4)(vi), or (d) (vii) of this section.

(iii) Pipes, ducts, boilers, tankers, reactors, turbines, furnaces, or structral members that are covered or coated with friable asbestos materials may be taken out of any building, structure, facility, or installation subject to this paragraph as units or in sections provided the friable asbestos materials exposed during cutting or disjointing are adequately wetted during the cutting or disjointing operation. Such units shall not be dropped or thrown to the ground, but shall be carefully lowered to ground level.

(iv) The stripping of friable asbestos materials used on any pipe, duct, boiler, tank, reactor, turbine, furnace, or structural member that has been removed as a unit or in sections as provided in paragraph (d)(4)(iii) of this section shall be performed in accordance with paragraph (d)(4)(ii) of this section. Rather than comply with the wetting requirement, a local exhaust ventilation and collection system may be used to prevent emissions to the outside air. Such local exhaust ventilation asytems shall be designed and operated to capture the asbestos particulate matter produced by the stripping of friable asbestos materials. There shall be no visible emissions to the outside air from such local exhaust ventilation and collection systems except as provided in paragraph (f) of this section.

*   *   *   *   *

(e) *Spraying.* There shall be no visible emissions to the outside air from the spray-on application of materials containing more than 1 percent asbestos, on a dry weight basis, used on equipment and machinery, except as provided in paragraph (f) of this section. Materials sprayed on buildings, structures, structural members, pipes, and conduits shall contain less than 1 percent asbestos on a dry weight basis.

*   *   *   *   *

(2) Any owner or operator who intends to spray asbestos materials which contain more than 1 percent asbestos on a dry weight basis on equipment and machinery shall report such intention to the Administrator at least 20 days prior to the commencement of the spraying operation. Such report shall include the following information: * * *

*   *   *   *   *

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